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STEEL

For forty-eight years — IRON TRADE REVIEW

March 26, 1931

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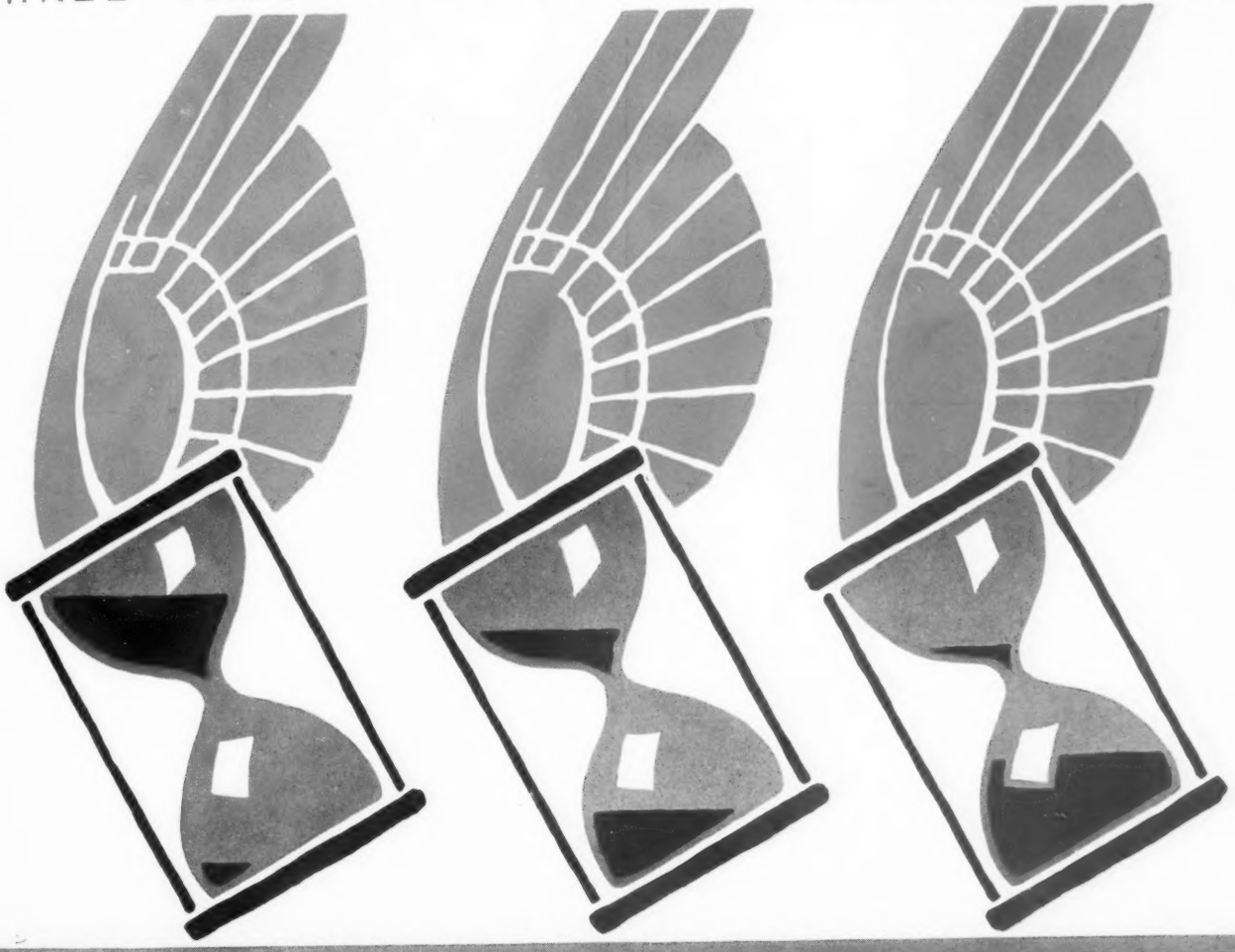

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STEEL-SERVICE

Volume 89 Number 13

STEEL

For forty-eight years—IRON TRADE REVIEW

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE

This Week in Steel

A MANUFACTURER who is a moderately-large consumer of steel reports that his production of small garden tools is negligible, but his steel fishing rod business is only 15 per cent below 1930 and his golf club department is at capacity, sales exceeding last year by 50 per cent. Promoters of large projects, convinced that the time and the price of steel are right, are awarding record-breaking tonnages, but small and moderate-size buyers are standing aloof. Typical, both, of the present unbalanced market situation in steel. For the great disillusionment of 1929 unbalanced prosperity was blamed; for the lethargy of early 1931 unbalanced recovery may be responsible. But, of course, only one nation has succeeded in leveling off distribution—and Russia has spread hardship and privation over her people with distressing uniformity.

The signs of ultimate recovery, however, are daily more apparent. Never has a builder made a commitment for 125,000 tons of structurals, as for the Metropolitan Square-Radio City development (Page 23) in New York. . . . Never except for rails has a railroad required 120,000 tons of steel, as the Pennsylvania (Page 65) for its eastern electrification program. . . . Never before has General Motors been sufficiently certain of the market to cover for nine months ahead on tin, zinc, copper, cotton and rubber (Page 26). . . . The government sees no barrier to proceeding with Hoover dam (Page 24), consuming ultimately about 100,000 tons of steel. . . . And the New York stock exchange will spend $10,000,000 preparing for the 10,000,000-share days just around the corner.

Corporation Employes Betting on Future

Steel corporation employes have registered their confidence in the future by subscribing (Page 24) to 126,627 common shares of their Corporation at $140, or 28 per cent more than in 1930 when the purchase price was $169. Only four times in the 28 years of employe-participation have more shares been taken up. . . . Perhaps there is a measure of appreciation and confidence in this showing, as the 1930 pamphlet report of the Corporation only now discloses (Page 25) the high cost of stabilizing employment. Per capita ingot output of Corporation employes declined 21 per cent in 1930, owing to the large labor force maintained, but the daily average of earnings, at $5.80, was only 4 cents below 1930.

Steel Maintaining Purchasing Power

This stabilization both of number of employes and their earnings is proof that the Steel corporation "cared for its own," as Myron C. Taylor and James A. Farrell consistently advocated. . . . For the entire steel industry the record is

Acme-P. & A. Photo

Not a gas tank, but a 14-story "skyscraper", to be built shortly at Potsdamer Platz, in the heart of Berlin. This is a model of the cylindrical shaped structure, in which steel will play an important part

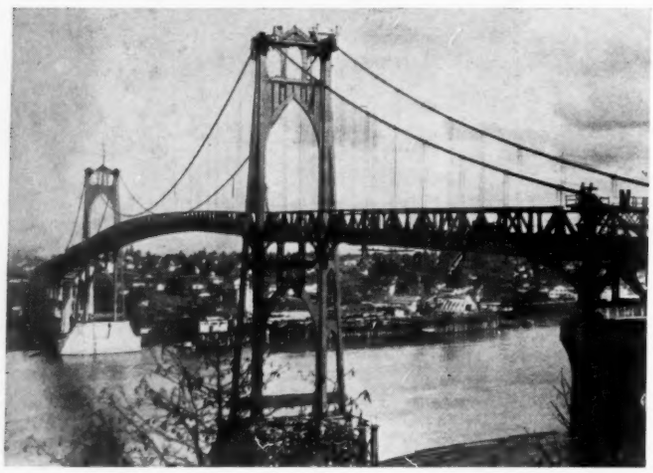
good, as a department of labor canvass reveals (Page 26) that the weekly earnings of steel industry employes in January averaged $23.95, or $1.46 more than the general average. The automobile industry, meanwhile, was paying its employes only $18.26 weekly. . . . There is some significance in the report of Secretary of Labor Doak that in February unemployment declined 1.4 per cent (Page 26), although nearly 6,000,000 persons still were in enforced idleness.

How Much Is 125,000 Tons of Steel?

Twelve battleships, a railroad connecting New York and Chicago, two Empire State buildings and enough remaining to start a third—these are the gage of the structural tonnage (Page 23) for the Metropolitan Square-Radio City project in New York. . . . This represents more than a tenth of the normal annual increase in steelmaking capacity of the United States, comparing it (Page 27) with the Russian 5-year plan. . . . To a degree, this building project of the Rockefellers bears out the contention (Page 24) of a prominent builder that in the future structures will spread horizontally rather than vertically. . . . Salesmanship to sell this 125,000-ton order is a yardstick for measuring capabilities. Steel founders assert (Page 51) that their salesmen are considered above par by 15 per cent of their trade, and at par by 83 per cent.

Too Long Even for Methuselah

When the Cambria Iron Co. in 1898 relinquished the properties which formed the nucleus of the present Johnstown plant of the Bethlehem Steel Corp. it did not sell them outright but leased them for 999 years. Not until 2897 will Cambria repossess these properties, but in anticipation of this event and to maintain its corporate life it elected a president recently (Page 24). Had Methuselah been born when the lease was signed and duplicated his Biblical span he would be dead 30 years before the lease expires. . . . This wait, however, is nothing to what farmers believe stands between them and relief, as in February the average price of their products fell (Page 25) to the lowest level in two decades. . . . It was almost this long that Pittsburgh expected to wait for relief from its smoke pall, but the increasing use (Page 94) of by-product coke for domestic heating has expedited it.



Acme-P. & A. Photo

With the longest main span west of the Rockies, this beautiful bridge spans the Willamette river from Portland to St. Johns, Oreg. Steel cables support it

Chromium May Be the Eyes of Night

Chromium's brightness may be more than a daytime joy to motorists. Pennsylvania is now experimenting (Page 94) with the chromium plating of license plate numbers, the smallest beam of light at night greatly enhancing their visibility and assisting in the detection of traffic offenders. . . . Pennsylvania's gleaming industrialists—Andrew W. and Richard B. Mellon—received the intellectual equivalent of a chromium finish from the American Institute of Chemists when it awarded them (Page 26) its medal for their contributions to science and industry. . . . Users of chrome-nickel steels find the soldering of joints less difficult by utilizing a new method (Page 41) which involves a special solder and fillets on the front and rear sides of the metal.

Tough-Hardness Yielding Its Secret

Greater economy in weight and size with no sacrifice of safety is the goal of engineers studying that dual property of steel known as tough-hardness. Fatigue testing machines now come closest (Page 42) to penetrating the secret. . . . X-ray diffraction patterns of metal are being used successfully (Page 48) to determine atomic structures, detect the presence of internal strains and identify new phases and compounds. . . . Forgings of intricate shape, with irregular contour, deep holes, unequal cross sections and other characteristics which formerly called for allowance of excess draft and an excess of metal to be machined away after hammer forging, can be shaped (Page 39) on an upset machine with marked savings in metal and satisfying most exacting requirements.

Industrial Thermometer Rises Slowly

Encouraging gains over January, with the entire panorama of business brighter, expand the mercury in the bulb of The Industrial Dial for February (Page 35). . . . This diagnosis is shared by James A. Farrell who in calling (Page 27) the next Foreign Trade Council convention sees the world-wide depression in business subsiding. . . . Pittsburgh district steelmakers look for their improvement to receive impetus (Page 33) from the adjustment of short-haul freight rates they have just won.

Most nearly approaching in size the Metropolitan Square-Radio City project in New York, taking 125,000 tons of steel, is the Cleveland Union Terminal group which required 100,000 tons. For the Merchandise Mart at Chicago, world's largest building, 60,000 tons were erected. Empire State, world's tallest building, 55,000 tons

Start 68-Story Building First in Record Structural Project

CLOSE co-operation between erector, fabricator and mill won the largest structural steel contract ever awarded—125,000 tons for the Metropolitan Square-Radio City development, New York, last week.

Post & McCord, who have erected the steel for many of the largest structures in the country, including the Empire State building, signed the contract to furnish and erect the steel. James A. Farrell, president of the United States Steel Corp., witnessed the signing of the contract. Post & McCord have sublet the fabrication of these 125,000 tons to American Bridge Co. Carnegie Steel Co. will roll the material.

While there are few steel erecting organizations and fabricators able to successfully complete such an undertaking, the business was not placed without some sharp figuring. The Bethlehem Steel Co. and its McClintic-Marshall Corp. division also figured in the bidding.

The contract, or contracts, for there were several, were closed without frills. There were no photographers. One contract was sent to Washington for the signature of Col. Arthur Woods, president of the Metropolitan Square Corp., representing the John D. Rockefeller Jr. interests. For Post & McCord, Andrew J. Post, president, and L. A. Post signed the pact.

Two firms of managing engineers in charge of engineering and construction of the nine units—Todd, Robertson & Todd and Todd & Brown Inc.—signed for the building corporation. Signers for the engineers and builders included John R. Todd, James M. Todd, Webster B. Todd, Hugh S. Robertson and J. O. Brown.

For several months architects and engineers have been working on plans for the 9-unit project, and since last summer a large part of the site has been cleared and used for automobile parking space. Few, however, outside those directly concerned realized that the project was ready for structural steel figuring and contract.

While 125,000 tons is now estimated for the framework in the various structures, it is possible that the total order will surpass this figure. The structural steel contract is only one of many contracts to be awarded soon which call for large orders of other steel and metal material. There will be 28,000 metal windows in the development.

Some idea of the volume of this tonnage may be derived when it is estimated by the engineers that a fleet of 12 modern battleships could be made from the steel required. If rolled into rails, a standard gage railroad could be laid between New York and Chicago. The steel beams if placed end to end would reach more than 700 miles. Between 5000 and 6000 cars would be required to haul the sections if the steel was to be moved at one time.

Delivery is expected to start on fabricated material in the fall, probably in late October. It is estimated that

'Radio City' Steel Pales Other Large Projects

COMPARE the 125,000 tons of structural steel let for the Metropolitan Square-Radio City development in New York, as reported exclusively in STEEL *last week, with other large projects:*

	Tons
Cleveland Union Terminal, Cleveland	100,000
Merchandise Mart, Chicago	60,000
Empire State, New York	55,000
Chrysler, New York	25,000
Union Trust, Cleveland	18,000
Civic Opera, Chicago	18,000
Board of Trade, Chicago	17,000
General Motors, Detroit	16,000
Hotel Stevens, Chicago	15,000
Daily News, Chicago	14,000
Gulf Oil, Pittsburgh	13,000
Koppers, Pittsburgh	12,000

actual cost of the steel, fabricated, will be about $10,000,000 and before the steel skeletons are in place, $15,000,000 may be expended. H. G. Balcom will be in charge of structural design, and erection of the material will employ at least 1000 men under the direction of 200 engineers, draftsmen and checkers.

The first building operation will include a 68-story skyscraper and broadcasting center at Forty-ninth and Fiftieth streets, between Fifth and Sixth avenues. This structure probably will be open in the fall of 1932. The steel contract calls for single pieces of huge proportions to be used in several of the buildings, including the International Music hall, likely to be the largest theater in the world.

Starrett Foresees Broader, Not Taller, Buildings

Chicago—Skyscrapers of the future are likely to expand horizontally rather than vertically, or at least that is the trend now, according to Col. William A. Starrett, head of Starrett Corp., in addressing the Chicago association of commerce recently.

No engineering reason exists why taller buildings should not be erected, Colonel Starrett said, but the objection is economic. In the future, tall skyscrapers may be the exception, he pointed out, as pooling land ownership will aid in bringing about wider structures.

"The 'multiple purpose' structure, which covers an entire city block is a logical development," he added. "Public convenience and economy of structure and operation all are served by this modern type of building which combines under one roof several different types of structures, each for a distinct purpose.

"Instead of developing small plots of land, each according to the individual owner's preference, the interests of all owners are pooled and the maximum advantage is obtained by using each part of the area for whatever purpose it is best suited."

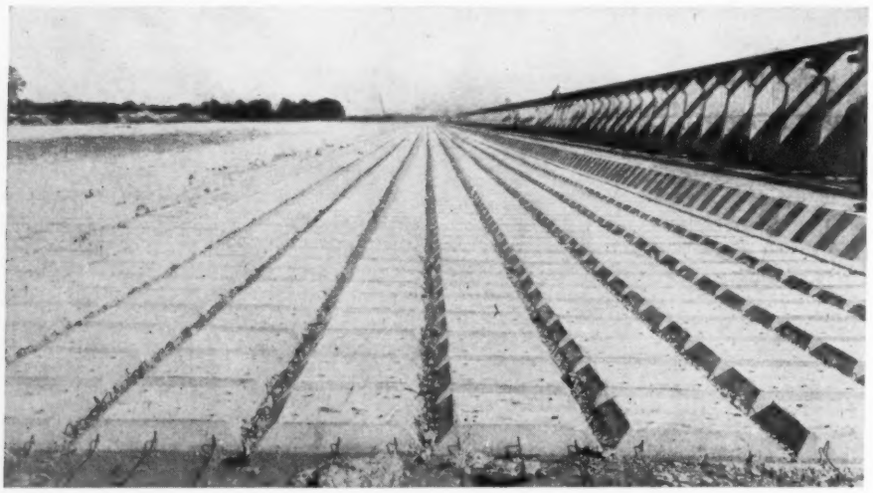
Hoover Dam Steel Tonnage Revealed in Estimates

Official estimates have been made of materials for construction of the Hoover dam project, contract for which has been awarded the Six Companies Inc. For the most part the government will buy the materials after taking bids and the contractor will install them. The company will buy and install 1580 tons of steel ribs, lineup plates and arching segmental plates in tunnels, shafts and adits.

The largest item includes 17,500 tons of reinforcing bars and rails and the next largest item is 9225 tons of structural steel, including bridge to intake towers. Other items include 6957 tons for conduit linings for power penstock; hydraulically operated gates, 5170 tons; conduit lining castings, 4785 tons; conduit linings for outlet works, 3217 tons; standard pipe, fittings and valves, 3300 tons; cylinder gates and hoists in intake towers, 2310 tons; needle valves, 2350 tons; trash rack metal work, 1170 tons.

Smaller items include: Anchor bars, 84 tons; control piping on high pressure gates, 25 tons; metal pipe for drains and culverts, 5 tons; steel sheet piling 351 tons; track rails, 206 tons; freight elevator structure, 165 tons; floor plates, 66 tons; metal stairways, 151 tons; traveling cranes, 147 tons; metal sash window operators, 60 tons; copper fixtures and hardware, 5 tons; steel partitions, 5 tons; sheet metal work, 12 tons; miscellaneous metal work, 115 tons.

Other material includes 20,000 lineal feet of electrical cables; metal conduit, 139,000 lineal feet, 1 to 6 inches diameter; metal sash windows and partitions 75,000 square feet; metal swing doors, 3200 square feet; metal rolling doors, 500 square feet; copper expansion strips, 150,000 lineal feet.



More water than passes over Niagara Falls can be controlled by this piece of engineering work, Bonnet Carre spillway, 28 miles north of New Orleans. Steel reinforcing makes it capable of withstanding the gigantic thrust of the waters from the flooded Mississippi river, which pour through the gates at the right and are turned by the baffle walls which will fit into the grooves shown with reinforcing steel ready to receive the concrete. Steel totaled 8563 tons, of structural, reinforcing and other forms

Bethlehem Bonuses Concealed, Say Dissenters

New York—A stockholders' "protective committee" has mailed a letter to 85,000 Bethlehem Steel Corp. stockholders protesting the corporation's bonus system as "most unseemly and improper," and seeking proxies to contest the system at the annual meeting, April 14.

The letter charges that payments of more than $31,000,000 to officers of the corporation were studiously concealed, and criticises Charles M. Schwab's plan to submit the bonus question to stockholders before the courts pass upon the suit which has been brought to recover bonus payments.

Only 966 Years To Go!

On Dec. 1, 1898, the Cambria Iron Co. leased for 999 years the iron and steel properties which after passing through numerous hands have become the Johnstown, Pa., plant of the Bethlehem Steel Co., but the Cambria company is being kept alive. Recently it elected Daniel M. Stackhouse president. If the Cambria company survives until Dec. 1, 2897, it will take title to the then-existing plant.

Buy 126,627 Steel Shares

New York—Employes of the United States Steel Corp. subscribed for 126,627 common shares in response to the recent offering under the corporation's stock subscription plan. The 1931 price was $140, compared with $169 in 1930 when 98,266 shares were subscribed for. The record for any year was 255,325 shares in 1921, when the stock was at $81.

Buys Williams Alloy Co.

Williams Alloy Co., Elyria, O., has passed to the control of the Studebaker Chemical Co., South Bend, Ind., of which George M. Studebaker is chairman of the board. The plant

of the Williams Alloy Co., manufacturing bearing metals and protective paints, at Elyria, will be enlarged, it is stated.

Reinforcing Steel Institute Elects New Officers

New officers elected at the seventh annual meeting of the Concrete Reinforcing Steel institute, March 16-18 at Biloxi, Miss., were: President, O. W. Irwin, Truscon Steel Co., Youngstown, O.; vice president, Charles M. Gunn, Gunn, Carle & Co., San Francisco; treasurer, Hugh J. Baker, Hugh J. Baker & Co., Indianapolis; secretary, M. A. Beeman; and engineer, R. W. Johnson. The last three were re-elected.

C. Louis Meyer, Concrete Engineering Co., Omaha, Nebr., retiring president, and Ralph F. Healy, Igoe Brothers, Newark, N. J., were elected directors for three-year terms. E. W. Langdon, Joseph T. Ryerson & Son Inc., Chicago, was elected director for one year to fill out the term of Mr. Gunn who, as a result of his election to the vice presidency, becomes an ex officio member of the board.

The Business Week In Washington

PLANNING for war but without any definite commitments that might conflict with future needs was recommended by Eugene Meyer, governor of the federal reserve board, to the war policies commission. William Green, president, American Federation of Labor, urged a levy on war profits but opposed conscription of property.

□ □ □

Department of agriculture has announced that the general level of farm produce prices declined in February and reached the lowest point in 20 years.

□ □ □

The state department announces that the number of passport visas issued to immigrants seeking entrance into this country was 90 per cent under the usual monthly quota during February.

□ □ □

"There is a very marked improvement in the mental attitude of the average business man today," Dr. Julius Klein, assistant secretary of commerce, stated in a recent address in which he said that factors now favor an imminent upturn in business.

Stabilizing Employment Raises Corporation's Costs

AN EMPLOYER with more than 200,000 workers and a yearly payroll of $400,000,000—the United States Steel Corp.—discloses in its annual report details pertaining to its production, income, profits, wages and salary disbursements. Nowhere else is there available for comparison industrial wage earnings and per capita productivity for a single institution on so large a scale. What did labor produce in 1930, compared with 1929, and what were its rewards?

Briefly, the per capita production of steel decreased; the labor cost per ton of finished steel increased. The percentage of net earnings to gross receipts was reduced, and the percentage of wages and salaries to gross receipts advanced. These were some of the results of holding a labor personnel intact to minimize unemployment and to act as a stabilizing force during the depression in 1930.

Payroll Reduction Slight

The average number of employes on the corporation's payroll last year was 211,055, only 6.19 per cent less than in the busy year 1929. Their wages and salaries in 1930 were $391,271,366 in 1930, the payroll being reduced only 6.86 per cent.

The employes in service as above stated represent the equivalent number working full time. A considerable number of individuals worked only part time in both years. In the foregoing totals the part time employes are reduced to and counted as proportionate employes on the basis of the pro rata time worked. The comparisons, therefore, are on an equal basis for the two years.

Per capita output of ingots in 1930 was 76.8 gross tons, 21.2 per cent less than in 1929, and the lowest since 1925.

Output of finished steel for sale per employe in 1930 was 55 net tons, a reduction of 19.3 per cent from 1929, and similarly the lowest since 1925.

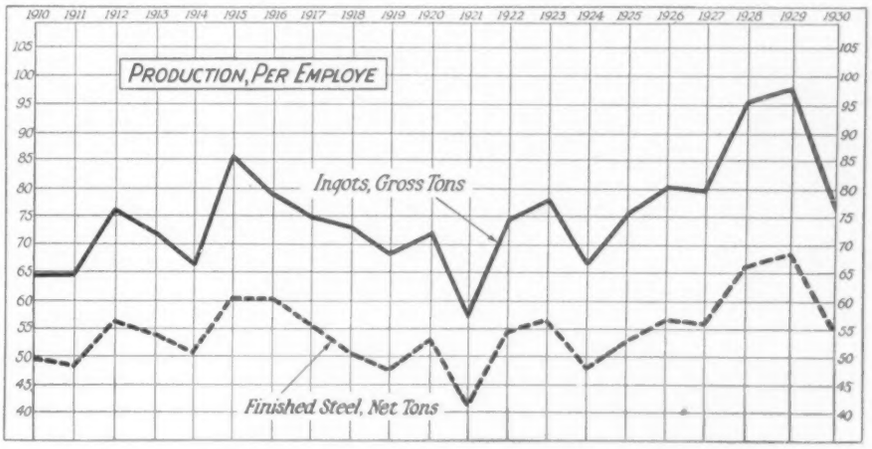
A comparatively small proportion of the employes is engaged in occupations not concerned in any way with the production of steel; the number is not large enough to upset certain conclusions, especially when the comparisons are on a uniform basis from year to year. The number engaged in construction service in 1930 was 11,092, or 5134 more than in 1929.

Workers Average $5.80 Daily

Average earnings per employe per day, exclusive of general administrative and selling forces, were $5.80, a reduction of only 4 cents from 1929. The average earnings for all, including adminstration and selling, were $5.99, approximately the same as in 1929.

According to the Corporation's report, the equivalent of 211,055 full-time employes received those earnings in 1930. In 1929 the comparable number was 224,980. The Corporation says that its plan of "staggering" employment afforded a fair degree of occupation to virtually all its employes, a much larger number than indicated by the equivalent of 211,055 on full-time. The difference between this full-time number for 1930 and 1929 was only 13,925 employes.

While the Corporation thus "took care of its own," as it announced it would do at the outset of the depression in 1930, the result of ir-



Trend of United States Steel Corp.'s Production Per Employe

regular operation was to increase its labor cost considerably.

The total wage and salary outlay in 1930 was equivalent to $33.70 per ton of finished steel manufactured for sale. In 1929 when operations were steady this item was down to $27.45, the lowest since 1922. The increase last year over the year preceding was $6.25.

The penalty for irregular operations with a large labor force in a poor business year also is disclosed in another comparison.

In 1929 the total wage and salary outlay was 28.1 per cent of the gross receipts. This was the lowest percentage in six years.

In 1930 the percentage increased to 33.1, the highest in six years. Wages and salaries had to be paid while production was reduced and prices were weak.

On the other hand, the percentage of net earnings to gross income dropped considerably as a result of these same factors.

In 1929 the percentage was 17.6, the highest in 12 years. In 1930 this percentage was reduced to 13.3, the lowest since 1927.

Per Capita Earnings in Steel Above Automobiles

Per capita weekly earnings were $22.49 in January in the combined 54 principal manufacturing industries for which the bureau of labor statistics compiles statistics. This was 5 per cent lower than in December and 12.3 per cent less than in January, 1930.

The figures are not to be confused with full-time weekly rates of wages. They are actual earnings computed by dividing the total amount of payrolls by the total number of employes. The number of employes includes all who worked any part of the week reported.

Per capita weekly earnings in iron and steel manufacturing plants in January were $23.95, or $1.46 above the general industrial average. They were 3.8 per cent lower than in December and 18.1 per cent less than in January, 1930.

The automobile industry is noted for its comparatively high weekly wage earnings when working full time, due to the larger proportionate number of skilled workers. Actual per capita earnings in that industry in January were $18.26, or $5.69 less than those in iron and steel manufacture.

Unemployed Estimated at 6,050,000 in January

Washington—Since the special census of unemployment in January there has been evidence of a slight but unmistakable improvement, according to Secretary of Commerce Lamont. Information obtained by the department from more than 13,000 manufacturing establishments reveals an increase of 1.4 per cent in the number employed during February compared with January.

The special census was taken in 19 cities the latter part of January when unemployment normally reaches a seasonal peak. On these figures Secretary Lamont estimates 6,050,000 were unemployed and seeking work. He estimates 250,000 to 300,000 additional had jobs but were on lay-off without pay. The census of April, 1930 indicated 2,429,062 were without work in that month.

BEAUTY of the capitol dome at Washington is not marred by this view through the construction work on the new house of representatives office building

Wide World Photo

Bolt and Nut Makers Appoint Employment Body

A special committee has been appointed by the Bolt, Nut and Rivet Manufacturers association, Pittsburgh, to formulate employment stabilization plans, according to Charles J. Graham, president. The committee which will co-operate with President Hoover's emergency committee on unemployment includes J. P. Hoelzel, vice president, Pittsburgh Screw & Bolt Corp., Pittsburgh; Evans Ward, vice president, Russell, Burdsall, & Ward, Port Chester, N. Y., and N. T. Jones, president, Superior Screw & Bolt Mfg. Co., Cleveland.

This group will canvass the industry to arrive at practical measures and findings will be reported to member companies.

Mellons Awarded Medal of Institute of Chemists

New York—Andrew W. Mellon and Richard B. Mellon have been named joint recipients of the medal of the American Institute of Chemists for distinguished service to the science and profession of chemistry. The announcement was made on March 24, the occasion of the seventy-sixth birthday of Andrew W. Mellon, secretary of the treasury. The medal is awarded annually and usually to someone outside of the chemical profession.

In announcing the award, Frederick E. Breithut, president of the institute, and head of the department of chemistry, Brooklyn college, said: "Andrew W. Mellon and Richard B. Mellon have contributed to the advancement of chemistry in its broadest aspects and have fostered the progress of industry by their farseeing and unselfish efforts. Through the agency of the Mellon Institute of Industrial Research they have been leaders in the great forward march of the American chemical industry."

By award of this medal, the American Institute of Chemists hopes to bring to the attention of the public activities of the Mellons which are not generally realized or appreciated but which are marked in their significance to the welfare and progress of the country.

General Motors Buys

New York—In anticipating its requirements for tin, zinc, copper, cotton and rubber for the remainder of the year the General Motors Corp. has exceeded all previous commitments. This action is accepted as conviction by the corporation that the price situation the remainder of the

year will be no lower than at present and probably higher. The corporation's requirements for steel are not definitely covered more than a quarter at a time.

Steel Imports Slump; Exports Hold in February

Washington—February iron and steel imports totaled 28,045 tons, compared with 40,781 for January. February exports of the same classification of commodities aggregated 91,212 tons, in comparison with January's 92,745 tons. Large import items include: 4341 tons of structural shapes; 3456 tons of pig iron; and 3432 tons of merchant steel bars. Exported products include: scrap, 10,690 tons; plain shapes, 8514 tons; tin plate, 7752 tons; and plates, 5571 tons.

Bethlehem Merges Hay?

Hay Foundry & Iron Works, New York, structural shape fabricator, is reported merging with Bethlehem Steel Corp., Bethlehem, Pa., although confirmation is lacking.

In addition to the Hay Foundry & Iron Works, Bethlehem Steel Corp. was reported seeking to merge with Hedden Iron Construction Co., and Levering & Garrigues, both New York fabricators.

Farrell Sees Upturn

New York—There are indications that the world wide depression in business is subsiding and that the upturn is beginning, declared James A. Farrell, president of the United States Steel Corp., in issuing the call for the eighteenth National Foreign Trade convention at New York, May 27-29. Mr. Farrell is chairman of the council. Sessions will be held at the Hotel Commodore.

Auction Eastern Steel Co.

Philadelphia—Eastern Steel Co., Pottsville, Pa., property will be auctioned April 20 by Frank T. Freeman & Son, Philadelphia, acting for the receivers. The company has a rated ingot capacity of 150,000 tons annually.

Merger Appeal Delayed

Youngstown, O.—The circuit court of appeals adjourned without considering the appeal from Judge David G. Jenkins' decision in the Bethlehem-Sheet & Tube merger case, which was set tentatively for March 19. It appears now the appeal will not be heard until June.

Russian Steel Capacity Increase Double Steady American Growth

STEEL ingot capacity planned by Soviet Russia under its five-year program is of interest in comparison with the increase in similar capacity in the United States. With the entire resources of the Russian government behind the industrial program, it is planned to carry steel ingot production from 5,553,600 tons in 1929 to 21,000,000 tons in 1933, an increase of 15,446,400 tons. The regular growth of steel capacity in the United States, without any spur to unusual activity, seems likely to bring an increase of more than 7,000,000 tons during the same period.

Figures on the Russian plan were presented in STEEL for March 19, based on progress already made and on plans for the remainder of the five-year period. Increased capacity from 5,500,000 to 21,000,000 tons is almost fourfold, and represents a tremendous undertaking on the basis of the industry as it existed at the beginning of the plan.

While the probable increase in capacity in the United States shows as practically half the total Russian increase, it is a much smaller percentage of growth, based on the vastly broader base of some 61,000,000 tons in 1929.

From that figure at the end of 1929, capacity increased to 62,265,000 tons at the end of 1930, according to official figures of the American Iron and Steel institute on steel ingot capacity. This was an increase of 1,274,000 tons. Figures presented by STEEL for Jan. 1, 1931, showed open-hearth furnaces completed in 1930 gave added capacity of 1,134,700 tons. In other years growth in ingot capacity has been considerably higher.

Thus it appears that the steel industry in the United States, in its natural growth without unusual pressure, adds an increment of capacity of 1,000,000 to 1,500,000 tons each year. This would carry capacity to approximately 68,000,000 tons by the close of 1933.

Whether Russia will be able to continue growth after the completion of the five-year plan is not apparent in the program now outlined. It seems certain the rate of growth by American steel plants will not be checked but will continue at least at the present rate.

Numerous variable factors enter into the figures on both sides of this comparison. Capacity and production are far from synonymous, as witness the fall in production in the United States from 54,850,433 tons in 1929 to 39,652,539 tons of ingots in 1930, while capacity increased more than 1,000,000 tons. Yet the capacity is ready to meet enlarged demand as it appears.

With the Russian government the only producer and also the only consumer, the variation in demand and production may be expected to be controlled to a great degree. Whether it will be possible to produce and consume at capacity is a matter yet to be determined.

THE young woman is not at an organ console but harmony results in rolling-mill operation from use of this piano-type control board produced by General Electric Co. One person with the foot pedals causes two motors of 10,000 total horsepower to reverse in two seconds and with the keyboard auxiliary drives are governed. Two men, at least, are required for similar work with conventional master switches

Auto Output Tops 200,000; Trend of Statistics Is Upward

FEBRUARY factory sale of automobiles went over the 200,000-unit mark for the first time since September of 1930. Gain was proportionately larger in the passenger car group, according to the department of commerce. Canadian February factory sales, according to the dominion bureau of statistics, rose almost 50 per cent from January. Following monthly tables show revisions:

	—United States—			Canada
1930	Total	Passenger cars	Trucks	Total
Feb.*	330,414	280,996	48,567	15,548
(Two Mos.)*	603,635	516,222	85,595	25,936
Mar.*	396,388	331,973	62,994	20,730
Apr.	444,024	375,685	67,853	24,257
May	420,027	364,512	55,075	24,672
June	334,506	288,481	45,562	15,090
July	265,533	224,690	40,467	10,188
Aug.	224,368	185,619	38,363	9,792
Sept.	220,649	177,752	41,967	7,957
Oct.	154,401	115,476	38,343	4,541
Nov.	135,752	102,358	32,785	5,407
Dec.*	155,701	122,748	31,528	5,622
(Year)*	3,354,986	2,805,516	540,534	154,192
1931				
Jan.*	171,851	139,755	31,584	6,496
Feb.	219,897	181,735	37,633	9,871
(Two Mos.)	391,748	321,490	69,217	16,367

*Revised.

Barrel Production Up

Production of steel barrels in January shows a gain of approximately 12,000 units over December. Immediate unfilled orders continue to improve and shipments have shown a slight betterment, according to report to the department of commerce by 27 establishments operating 32 plants:

1930	Production	Shipments	Unfilled orders within 30 days
Jan.	650,764	643,120	304,354
Feb.	604,709	599,324	313,349
March	771,686	785,951	417,933
April	769,061	766,617	322,161
May	731,087	736,147	393,843
June	651,559	638,358	319,754
July	617,420	621,091	311,630
Aug.	553,842	552,265	237,745
Sept.	564,927	565,204	253,745
Oct.	616,121	619,558	275,778
Nov.	497,539	500,409	230,960
Dec.	412,283	406,327	188,902
(Year)	7,440,998	7,434,371	.....
1931			
Jan.	424,184	427,622	210,416

Galvanized Output Expands

Pails and tubs production in January rose sharply to the highest level since October, 1930. Shipments also were improved. Likewise, there was a gain in production of all other ware, according to the following from the department of commerce:

(In dozens)

	Pails and Tubs		Other Ware
1930	Production	Shipments	Production
Jan.	145,588	154,731	33,982
Feb.	119,739	129,853	35,121
March	135,178	135,602	37,963
April	131,015	120,552	44,058
May	113,645	107,496	44,405
June	89,982	82,956	40,646
July	91,879	104,096	42,056
Aug.	103,050	103,354	46,730
Sept.	103,177	116,875	38,218
Oct.	130,906	115,185	40,084
Nov.	60,798	68,330	16,061
Dec.	87,140	68,898	21,657
(Year)	1,309,097	1,307,928	440,981
1931			
Jan.	103,677	133,977	23,716

Foundry Equipment Orders Take Turn Downward

After a brief recovery in January, index of gross orders for foundry equipment slumped in February to 54.7, according to the Foundry Equipment Manufacturers' association from report of 17 members. Shipments were constant at January's rate and the index of unfilled orders showed no appreciable change. Following is index of gross orders by months:

	1931	1930	1929	1928
Jan.	65.3	160.1	180.5	132.7
Feb.	54.7	196.4	197.0	123.6
Mar.	.....	164.1	209.4	138.6
Apr.	.....	122.8	172.6	107.7
May	.....	92.7	177.7	335.6
June	.....	102.1	177.3	149.1
July	.....	90.6	219.3	94.8
Aug.	.....	85.2	229.5	278.0
Sept.	.....	91.0	216.3	170.0
Oct.	.....	50.0	245.3	185.0
Nov.	.....	45.3	128.6	197.8
Dec.	.....	59.8	208.0	166.5

Base: Average monthly shipments for 1922-23-24 taken as 100.

Orders for Railroad Locomotives Show Gain

Shipments of railroad locomotives continued slow in February, only 15 being reported for domestic use, against 16 in January and 49 in February, 1930. Unfilled orders were swelled in February by foreign commitments, the figure showing a gain of 12 units. Total unfilled orders of Feb. 28 were 103 locomotives compared with 91 on Jan. 31, 536 on Feb. 28, 1930, and 342 on Feb. 28, 1929. The following table shows department of commerce figures for shipments and unfilled orders by months:

	Shipments		Unfilled Orders	
	Domestic	Foreign	Domestic	Foreign
1930				
Feb.	65	3	526	10
(Two Mos.)	113	3	.....	.....
March	66	4	530	6
April	94	3	462	7
May	56	2	411	9
June	80	1	335	8
July	55	1	284	7
Aug.	73	4	229	5
Sept.	65	.....	169	5
Oct.	50	.....	127	5
Nov.	43	.....	88	5
Dec.	44	5	104	.....
(Year)	739	24	.....	.....
1931				
Jan.	16	.....	90	1
Feb.	15	.....	92	11
(Two Mos.)	31	.....	.....	.....

STEEL'S Operating Rates Parallel Institute's

Steelworks operating statistics as compiled by STEEL each week on the basis of reports from the various districts continue to range within a point or two of the figure announced by the American Iron and Steel institute following receipt of actual reports from steel producers.

The average of STEEL'S weekly compilations in February was 50.9 per cent; the institute average for February was 52.6 per cent. Comparisons for recent months follow:

1930	STEEL	American Iron and Steel institute
October	52.8	50.32
November	44.87	44.64
December	38.00	38.57
1931		
January	45.25	45.94
February	50.9	52.6

Financing Plans for Steel Producers Announced

Youngstown Sheet & Tube Co., Youngstown, O.; National Steel Corp., Pittsburgh; and possibly Newton Steel Co., Youngstown, O.; and Otis Steel Co., Cleveland, are planning new financing.

The Sheet & Tube proposal calls for the issuance of $25,000,000 5 per cent series B bonds, already reported to be oversubscribed. Otis Steel is preparing to float $5,000,000 of 5 per cent bonds. Both of these companies are spending large sums on new continuous sheet mills. Newton Steel is rumored planning a $10,000,000 bond issue.

National Steel Corp. is taking steps toward completion of a financing plan for reimbursing the company for expenditures in development and expansion. Recent building program has cost $23,282,806 and in addition there is $9,821,332 of subsidiary obligations.

Industrial Men in the Day's News

L. F. Rains, President, A. M. Byers Co., Pittsburgh

EXPERIENCE in coal and iron ore furnished the foundation for his career in iron and steel.

ILLINOIS, Utah, California and now Pennsylvania have been the main spheres of his labors.

UNDER his direction the Provo, Utah, blast furnace and coke ovens of Columbia Steel Corp. were built.

LONG experienced in the raw materials division of the iron and steel industry, L. F. Rains, recently vice president and general manager of the Columbia Steel Corp., San Francisco, turned to a new field shortly after the first of this year when he was chosen president of the A. M. Byers Co., Pittsburgh, manufacturer of wrought iron pipe and other products with a new plant at Ambridge, Pa. The appointment filled the vacancy caused by the death Oct. 9, 1930, of A. H. Beale.

Mr. Rains' industrial career has been spent largely in the Middle and Far West, and although coal and iron ore figured most prominently in his activities, he brings to his new office an invaluable executive training acquired through his years of association with various projects in the development of the iron and steel industry on the Pacific Coast.

Mr. Rains originally was identified with the coal mining industry in the Chicago territory. Turning his eyes westward he developed and financed three coal mining projects in Utah before he became interested in the Columbia Steel Corp., San Francisco. This company, now a subsidiary of the United States Steel Corp., was organized Nov. 22, 1922, to acquire the Columbia Steel Co., San Francisco. It comprised Pittsburgh works, Pittsburg, Calif., Portland works, Portland, Oreg., and Llewellyn mills, Torrance, Calif. In 1923-4 it built the Ironton plant, near Provo, Utah, with blast furnace and by-product coke ovens, which were built under the personal direction of Mr. Rains, who at that time came with the company as vice president. In 1927 the duties of the assistant general manager were added and later he was appointed general manager. When in 1929 the company was acquired by the United States Steel Corp., to be operated as the Columbia department of its subsidiary, United States Steel Products Co., and later as the Columbia Steel Co., subsidiary of the United States Steel Corp., Mr. Rains continued as vice president in charge of operations and general manager.

He is a member of the American Iron and Steel institute and the American Society of Mining and Metallurgical Engineers.

WW. BROWN, formerly district sales manager for the Pittsburgh territory of the Youngstown Sheet & Tube Co., Youngstown, O., has been appointed manager of wire and bar sales at the main office in Youngstown. Guy B. Strausner succeeds him at Pittsburgh.

Clyde F. Andler has been appointed district sales manager for the Buffalo territory to succeed Mr. Strausner, now manager at Pittsburgh.

Earl H. Braunbern has been appointed district sales manager for the Youngstown territory to succeed Mr. Andler, now district manager at Buffalo.

Roderick D. MacKenzie has been appointed district sales manager for the Cleveland territory, to succeed the late G. G. Stuart.

G. W. Christopher has been appointed assistant manager of pipe sales, with headquarters at Youngstown. On Sept. 15, 1923, Mr. Christopher became Pittsburgh manager succeeding E. S. Rooney, then transferred to Cincinnati. Since early in 1927, however, he has been located at the home office in Youngstown.

Stanley H. McKee, formerly chief engineer of Republic Steel Corp., Youngstown, O., and C. G. Jones, formerly identified with Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., have been made special engineers by Youngstown Sheet & Tube Co.

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J. C. Hamilton, secretary of Colorado Fuel & Iron Co., Denver and Pueblo, Colo., was elected a director March 16 to fill a vacancy. Other board members are George B. Berger, Claude K. Boettcher, Fred Farrar, W. A. Maxwell Jr., S. G. Pierson, Albert A. Reed, Arthur Roeder, J. F. Welborn, and E. T. Wilson, all of Denver; M. D. Thatcher of Pueblo;

Thomas M. Debevoise and Arthur Woods of New York. Messrs. Woods, Debevoise and Roeder were elected members of the executive committee.

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C. M. Emerson has become affiliated with the New York office at 50 Church street, of the Alan Wood Steel Co., Conshohocken, Pa.

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John D. Tyson, formerly assistant metallurgical engineer, Standard Steel Works Co., Burnham, Pa., has been appointed chief metallurgist.

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G. E. Madden, formerly with Union Steel Castings Co., Pittsburgh, will represent the Industrial Silica Corp., Youngstown, O., in the East.

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George B. Reed has been appointed sales manager of Detroit Forging Co., Detroit, to succeed A. L. Rose, resigned.

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Col. Victor Spencer was re-elected president of Western Bridge Co. Ltd., Vancouver, B. C., at the company's annual meeting.

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P. S. Dickey, who for several years has specialized on automatic combustion control problems for the Bailey Meter Co., Cleveland, has been appointed research engineer.

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Thomas Holloway, formerly with Farrell Foundry & Machine Co. at Buffalo, has joined the United Engineering & Foundry Co., Pittsburgh, as gear consultant.

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N. L. Howard, formerly president of the Chicago Great Western railroad, has been elected chairman of North American Car Corp., Chicago, a newly-created position.

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John A. Mair has been appointed field engineer of the Buffalo plant, Worthington Pump & Machinery Corp., New York.

Anthony F. Beres has been made personnel manager.

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D. M. Bigge, formerly vice president and general manager of Panyard Piston Ring Co., Muskegon, Mich., has been made president and general manager. He succeeds P. P. Schnorbach as president.

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Harold H. Perry has resigned as vice president and director of Industrial Brownhoist Corp., Cleveland and Bay City, Mich., to become an executive in an Illinois equipment industry.

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William E. Hall, of New York, was elected president of Duriron Co. Inc., Dayton, succeeding the late P. D. Schenck, founder of the company.

Dudley H. Miller, of St. Marys, Pa., was elected vice president and appointed general manager. Other officers are: John R. Pitman, vice president, New York; Robert C. Schenck, Dayton, secretary, and E. B. Thacker, Dayton, treasurer.

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J. W. Duncan has resigned as vice president and manager, U & I Boiler Welding & Machine Works, Tonkawa, Okla., to become manager of Williams Welding Works, affiliated with Williams Iron Works, Tonkawa.

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C. E. Meissner, formerly sales manager of Chrome Steel Corp., Chrome, N. J., was recently appointed production manager of Marine Steel Corp., Chrysler building, New York.

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John W. Blackford, for the past eight years with the Torrington Co., Torrington, Conn., the last two of which he was Detroit manager, is now identified with the sales organization of the Norma-Hoffmann Bearings Corp., Stamford, Conn.

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H. D. Bennett, president, Toledo Scale Mfg. Co., Toledo, O., also was elected treasurer at a recent directors' meeting. C. O. Marshall was elected secretary. The former secretary-treasurer, William Zolg, died recently.

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T. A. Burdick, New York, has been appointed manager of the power division of Alco Products Inc., subsidiary of American Locomotive Co., New York. He formerly was chief engineer of General Water Works & Electric Corp., Fort Worth, Tex.

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Charles S. White has been appointed general purchasing agent for the New York Central Lines, 466 Lexington avenue building, New York. Charles C. Warne has been appointed purchasing agent for the railroad, and William J. Warnock has been appointed Mr. Warne's assistant.

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J. H. Miller, formerly assistant manager of Westinghouse Supply Co. of Pennsylvania, has been appointed Michigan division manager. The territory includes Detroit, Grand Rapids and Flint, Mich., and Toledo, O. He succeeds C. E. Ludovici, now in charge of the Philadelphia office.

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E. M. Barnes, who as noted in STEEL of March 12 has been appointed sales agent by Gulf States Steel Co., Birmingham, Ala., in the sale of its basic and foundry iron, was for many years Birmingham sales agent for pig iron for Republic Iron & Steel Co., now Republic Steel Corp., Youngstown, O.

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Harry W. Kranz, of Cleveland, was recently added to the board, of directors of Motor Wheel Corp., Lansing, Mich. He is president of Cleveland Welding Co., Cleveland, control of which was purchased by Motor Wheel Corp. last year. Harry F. Harper was re-elected president and general manager of the latter corporation.

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Arthur H. Senior has been appointed traffic manager of Union Drawn Steel Co., Beaver Falls, Pa., subsidiary of Republic Steel Corp., Youngstown, O. He succeeds the late Arthur W. Boyd. Mr. Senior became associated with the Union Drawn company in 1924 and has served as assistant traffic manager since 1928. His former affiliations were with Pennsylvia and Baltimore & Ohio railroad rate departments.

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H. R. Krueger was recently elected vice president in charge of engineering, Ex-Cell-O Aircraft & Tool Corp., Detroit.

William F. Wise was elected vice president in charge of sales.

Other officers were chosen as follows: N. A. Woodworth, president and treasurer; Phil Huber, vice president and secretary; J. W. Rothmeyer, vice president in charge of Krueger-Wayne division; Thor M. Olson, vice president in charge of Continental Tool division; Glen Bixby, assistant secretary; and F. F. Murphy, assistant secretary.

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James F. Drake, chairman of Pullman Inc., Chicago, since the merger a year ago of Standard Steel Car Co., of which he had been president since 1923, and the Pullman Co., will resign this month to become president of the Gulf Oil Corp., Pittsburgh. He was elected to succeed W. L. Mellon, who was made chairman. Mr. Drake will remain a director of Pullman Inc., and of the Pullman Car & Mfg. Corp.

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James C. Mears, pioneer pig iron salesmen, will retire March 31 on the forty-third anniversary of his connection with Rogers Brown & Co., Cincinnati, and its successor, Rogers Brown & Crocker Bros. Inc. He started with the company in 1888 as a salesman covering the Cincinnati market territory until 1891 when he became resident manager at St. Louis. He remained there 33 years and since has held a similar post in the Rogers Brown Chicago office.

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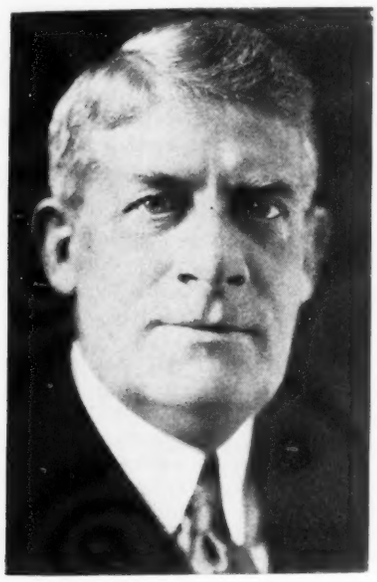
Hon. Gordon W. Scott, partner since 1914 in the firm of P. S. Ross & Sons, Montreal, Que., chartered accountants, has been appointed director of Canadian Tube & Steel Products Ltd., Montreal. Other officers and directors are: Milton L. Hersey, president and managing director; A. H. Hough, vice president and general sales manager; C. M. Thomson, vice president in charge of manufacturing; P. B. Nash, secretary-treasurer, and John W. Ross, chairman of the executive committee. Messrs. Hersey, Hough, Ross, Scott and George Hunter, J. C. Hodgson, H. H. Vaughan, Hon. Senator Webster and Stanley Brock are directors.

Obituaries

WILLIAM G. CLYDE, who died in Pittsburgh March 23, resigned in 1930 as president of Carnegie Steel Co., that city, on account of ill health. He had filled that office since Oct. 30, 1925, when he was appointed to succeed Homer D. Williams, resigned. Previously from April 1, 1918, Mr. Clyde had been vice president, member of the board of directors and general sales manager.

He was born July 29, 1868, in Chester, Pa., where he attended public schools. He was graduated from Pennsylvania Military college in



William G. Clyde

1888, which in June, 1924, conferred on him an honorary degree of doctor of applied science. Following college he was employed as steam shovel operator by Ryan & McDonald, Baltimore, contractors, where he rose to be civil engineer. He later became associated with Robert Wetherill & Co., Chester, machinists and founders.

Mr. Clyde began his steel mill experience with Wellman Steel & Iron Co., Thurlow, Pa., as ingot tracer. He became a roller on its 132-inch plate mill and finally was appointed superintendent of plate mills. Subsequently he became affiliated with Illinois Steel Co., South Chicago, as plate mill superintendent, where he remained for six years. He next was traveling salesman in the Chicago district for American Steel Hoop Co., and when it established its Philadelphia branch office Mr. Clyde was selected as district sales manager, which duties he was discharging when the American company was absorbed by Carnegie Steel Co.

Mr. Clyde remained at Philadelphia, traveling for the Carnegie company and later served in a similar capacity out of Cleveland. In 1905 he was called to Pittsburgh to become assistant general manager of sales, and about 13 years later was advanced to general manager of sales. In March, 1918, he was made vice president and general manager of sales and also was elected a director. In March, 1924, he also was given general supervision of all warehouses. As previously noted his next promotion Oct. 30, 1925, took him to the presidency, from which he retired Aug. 31, 1930.

Mr. Clyde was a member of the board of trustees of the Carnegie institute and its associated activities, including Carnegie Library, Carnegie Museum and Carnegie Institute of Technology. He was a member of the American Iron and Steel institute and numerous clubs in New York and Pittsburgh.

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Robert Woodward, 88, formerly chairman of the board of Edgar Allen & Co. Ltd., Sheffield, England, died March 9.

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Francis G. Hitchins, 65, who for 39 years was vice president of Headford Bros. & Hitchens Foundry Co., Waterloo, Iowa, died there March 7.

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L. E. Waite, 55, for the past five years manager of the wheel division of Erie Malleable Iron Co., Erie, Pa., died there March 19.

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George R. Metcalf Sr., chairman of the board, Erie Malleable Iron Co., Erie, Pa., since late 1928 and prior to that president of that company, died at his home in Erie, March 23.

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John Boswell, 55, superintendent, American Car & Foundry Co., Granite City, Ill., died March 9. He had been employed by the American company for the past 20 years and latterly had charge of the erecting department.

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Frank E. Wheeler, 78, president, International Heater Co., Utica, N. Y., died recently. Following graduation from Yale in 1876, he became partner in the business of his father, Russel Wheeler & Son, Utica. This company late merged with others to form the International company.

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Alfred B. Botfield, whose death recently at Miami, Fla., was briefly noted in STEEL of March 19, located in the United States after a period in Cuba, where in 1899 he acquired control of a marine construction and repair enterprise at Havana. He established Botfield Furnace Specialties Co., Philadelphia, to build and repair stationary and marine boiler settings. He experimented in the development of a cement to serve as a brick bond and in 1907 successfully produced Adamant for bonding fire brick in boiler settings at Continental Dye Works, Philadelphia. From that time he devoted practically his entire time to the development and marketing of high temperature cement for fire brick construction. He retired in 1915 and his son, Leonard B. Botfield, succeeded him as president. The son now is president of the succeeding company, Botfield Refractories Co.

Alfred B. Botfield

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Stanley Hale Bullard, 53, vice president and works manager, Bullard Co., Bridgeport, Conn., formerly Bullard Machine Tool Co., died March 23 at his home in Fairfield, Conn. He was born July 4, 1877, in Hoboken, N. J., and was son of E. Payson Bullard, founder of the company. He became an apprentice at the Bullard works, following his graduation from a military school in 1895. He was journeyman machinist in 1900, sales representative 1901 to 1909, sales manager from 1909 to 1915, works manager from 1915 to 1918 and then was made general works manager and vice president.

Mr. Bullard was one of the original members and a leader in the Connecticut Manufacturers' association, also the New England council. He was a director of the Chamber of Commerce of the United States, a director of sev-

(Concluded on Page 75)

Here and There in Industry

STANDARD SPRING & MFG. CO. LTD., 564 Market street San Francisco, has completed a plant at South San Francisco, Calif., for the manufacture of coil and elliptic springs for railroad, street railway and industrial use. Production will be in charge of Fred A. Meckert, vice president, who formerly was general manager of the Fort Pitt Spring & Mfg. Co., Pittsburgh. John P. Bell, formerly resident vice president of the Fort Pitt Spring & Mfg. Co. at San Francisco, is president and T. C. Blue is secretary and treasurer.

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Mountain State Steel Foundries, Parkersburg, W. Va., now is represented at Nashville, Tenn., by McCarthy-Jones & Woodward Co. Inc., 107-09-11 First avenue, South.

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Fellows Gear Shaper Co., Springfield, Vt., has moved its sales and service office at Detroit to 616 Fisher building. The office is in charge of W. F. Slomer.

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Tabor Mfg. Co., Philadelphia, has established a sales office at 2842 West Grand boulevard, Detroit, for the sale of its foundry molding machines.

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Wetmore Pulverizer & Machinery Co., Tonkawa, Okla., has been organized by E. M. Wetmore, owner and manager, to manufacture feed grinding and pulverizing machinery. A plant was recently completed and is now in production.

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Koppers Co., Pittsburgh, has announced that sale and distribution of products of its subsidiaries, American Tar Products Co., Koppers Products Co. and Tar Products Corp., has been consolidated and unified under the name of the Koppers Products Co.

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C. I. Banker Wire & Iron Works Co. Inc., Milwaukee, has been formed as a corporation to succeed the partnership formerly operating as the C. I. Banker Wire & Iron Works. Its products include wire, wire cloth and springs. Peter J. Pinter continues the principal owner.

□ □ □

Lake Shore Engine Works, Marquette, Mich., has taken a contract for 150 hoists for the new ore dock the Duluth, South Shore & Atlantic railroad is to build at Marquette. This will occupy a portion of the company's capacity the remainder of the year.

□ □ □

James Criswell Co., Pittsburgh, has received an order for the lining of the 400-ton open-hearth steel furnace for the Fordson, Mich., plant of the Ford Motor Co. The Pennsylvania Engineering Works, New Castle, Pa., has the order for the furnace and two 600-ton hot metal mixers. Work on the furnace will start shortly.

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Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has received an order from the Electromotive Co. for equipment for five 400-horsepower gas-electric cars to be used on the Santa Fe railroad. These cars will be duplicates of four bought by the same railroad in 1929, with power, baggage and passenger sections.

□ □ □

Weaver Bros. Co., Adrian, Mich., manufacturer and dealer in pickling supplies, has united its interests with H. J. Bowie & Co., Cleveland, fabricator of steel, and will move its activities to Cleveland. The plant will be located at 9205 Inman road, Cleveland. Devices for use in pickling will be fabricated by the Bowie company.

□ □ □

Northern Equipment Co., Erie, Pa., has appointed several representatives for sale of its feed water regulators, differential valves, pump governors and allied equipment; Joseph W. Eshelman, 1220 Webb-Crawford building, Birmingham, Ala., for that state; Economy Equipment Co., 301 Buder building, St. Louis, for that territory; Bell & Eiss Inc., 459 Northwestern National Life building, Minneapolis, for Minnesota.

□ □ □

Dominion Hoist & Shovel Co. Ltd., Montreal and Lachine, Que., recently organized to manufacture and sell in Canada the lines of shovels and hoists now manufactured by the American Hoist & Derrick Co., St. Paul, advises that for the present manufacturing operations will be carried on by its associated companies. Officers have been elected, as follows: President, G. H. Duggan, Montreal; vice presidents, H. G. Welsford, Montreal, H. S. Johnson, St. Paul; secretary and treasurer, B. H. Phillips, Montreal.

□ □ □

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., has moved its Pittsburgh sales office to the Grant building, rooms 1524-5. Roy M. Hurst has been transferred from the New York office to be district manager, assisted by Frank J. Kinney. The sales office at Cleveland has been moved to 1433 East Twelfth street. Harry A. Baugh has been made district manager. For many years he was manager at Pittsburgh and recently has been in the Chicago office. These changes in personnel are effective April 1.

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Port Arthur Foundry, Port Arthur, Tex., recently incorporated to operate a gray iron foundry, has named G. R. Brent president and general manager, C. H. Steele vice president and secretary and M. S. Steele treasurer. It is expected to begin operations about April 1.

□ □ □

Duer Spring & Mfg. Co., McKees Rocks, Pa., has been repurchased by the management prevailing prior to its merger a year ago with the Fort Pitt Spring Co., McKees Rocks, and now is operating as an independent corporation. At a recent meeting the following officers were elected: President, J. D. Culbertson Jr.; vice president, T. H. Hunter; secretary and treasurer, H. W. Bowles. All of the officers have long been identified with the spring industry. The company manufactures all types and sizes of coil and flat springs, specializing in heat-treated springs of alloy and carbon steel.

□ □ □

Freyn Engineering Co., Chicago, has taken an order from the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., for a continuous stockline recorder for a blast furnace at Ensley, Ala., the third such device the company has bought from this firm. The Freyn company has also booked an order for two electric roll heaters for the Tokuyama Steel Sheet Co., Tokuyama, Japan. A previous order for two roll heaters was placed six months ago. Amtorg Trading Corp., New York, has bought from the Freyn company ten continuous stockline recorders and 16 pressure burners for hot-blast stoves, for installation at steel plants in Russia.

□ □ □

American Chain Co. Inc., Bridgeport, Conn., through a subsidiary, the American Cable Co., New York, has licensed the American Steel & Wire Co., subsidiary of the United States Steel Corp., for the manufacture of preformed wire rope under patents owned by the American Cable Co. In this form of rope the wires and strands are preformed and preshaped to the exact helical lay which they assume in the finished rope, doing away with internal torsional stresses. Licenses also have been granted the General Cable Co., five Canadian manufacturers, British Ropes Ltd. and four other companies in Great Britain, Australian Wire Rope Works Ltd. and Felten & Guilleaume, German and Continental wire rope manufacturer.

F. o. b. PITTSBURGH

PITTSBURGH

STEEL shippers, gratified by the recent decision of the Pennsylvania public service commission which directed a reduction in short haul freight rates, have other matters to settle in connection with this subject. Petitions for rebates on excess freight paid from May 20, 1930, to the date when the lower rates go into effect will be filed, and an enlargement of the Pittsburgh switching area also will be sought.

The commission on Feb. 23 instructed the carriers serving the Pittsburgh district to put the new scale into effect within 20 days, which would mean that shippers have a ten-months' freight bill on which a rebate will be asked.

It is estimated that in a normal year the recent freight schedule meant an increased annual charge of $1,500,000 to $2,000,000, so that the recovery for the past ten months will be around $1,000,000. The new scale to be installed is a graduated one ranging from 3 cents per 100 pounds on hauls of five miles and less to 16 cents on shipments of 95 to 100 miles from whence it merges with the general schedule of the interstate commerce commission.

Save Most of Rate Rise

Rates prevailing prior to May 20, 1930, were not on a direct mileage basis and although the new charges still are slightly higher than the ones superseded last year they will save shippers about three-fourths of the increased freight bill applied as the result of the recent scale.

The larger portion of this saving will accrue on hauls up to 50 miles, being smaller on shipments of 50 to 100 miles. Some hauls will be lower under the new setup than before May 20, 1930. To Brackenridge from Pittsburgh, for example, the new scale will be 6 cents, against 9 cents at present and 7.5 cents formerly. To Beaver Falls the new rate of 6.5 cents would be 2.5 cents less than the current charge and 1.5 cents less than prior to May 20 last year.

From Pittsburgh to Aliquippa, where one of the Jones & Laughlin Steel Corp. plants is located, however, a new rate of 5.25 cents compares with 8 cents at present and 3.5 cents a year ago. Shippers turned to trucking and the rivers last year in an attempt to escape the cost of the higher rates, and it is possible that the railroads will recover some of the business lost on the former score. Carnegie Steel Co. commenced the hauling of plates from Homestead to the National Tube Co. plant at McKeesport when the rail rate was raised from 73 cents a net ton to $1.30. This rate will be reduced to 75 cents.

Much Heavy Equipment Sold

Depression has brought the reverse situation for heavy mill equipment builders of the Pittsburgh district, 1930 being a banner year for the leading interests here, and business already booked indicates that brisk activity is in store for the remainder of 1931. The recent report of the Mesta Machine Co. for 1930, showing the largest profits in its history, stated that unfilled orders Jan. 1, 1931, were larger than a year ago and that this year's outlook remains favorable. Demand for rolls and ingot molds naturally has been quiet for a number of months, and but slight improvement has been noted recently.

Less new plant construction of a major nature is in prospect for Pittsburgh mills in the near future, following fairly good activity in this respect for the past several years. Jones & Laughlin Steel Corp. still is working on its $8,000,000 improvement program, but the National Tube Co. is practically through with its large building project at McKeesport. Weirton Steel Co. for several months has been operating its new rail and structural mill, built last year at Weirton and has no new work of size under way at this time.

National Steel Corp. has its proposed Chicago plant in mind, but it is unlikely that actual construction will be commenced this year. A. M. Byers Co.'s new plant near Ambridge, Pa., has been in operation since last fall. The Tarentum Steel Corp., formed some time ago, proposes to erect a $1,500,000 plant at Tarentum, Pa., for the production of flat rolled products. Financing was suspended last year, but an attempt now is being made to complete it.

Reports indicate that Spang, Chalfant & Co. will follow the lead of other producers of electrically welded pipe in building a mill of this character. A year ago Spang was understood to have prepared plans for such a plant but actual construction was never started and in the meantime control of the company was bought by the National Supply Co., large supplier of materials for oil and gas well use and an important figure in the construction of pipe lines.

May Add Electric Welding

Spang currently is furnishing National with tubular products for distribution from the various stores of the latter. It produces lapwelded pipe in diameters as large as 24 inches at its Etna plant, but is not in a position to make the electrically welded line pipe that has taken such a dominant position in the construction of facilities for transportation of natural gas, oil and gasoline. Announcement from Spang or National is lacking in regard to the proposed construction, but it would seem natural that such a move would be made.

National Supply Co. recently issued an enviable statement showing current assets in excess of $43,000,000, including more than $6,000,000 in cash, against current liabilities of slightly over $2,000,000. This is a

(*Concluded on Page 94*)

EDITORIAL

Large Corporations Give Security to Employment

IT TAKES a year like 1930 to show how large corporations may serve as business stabilizers during a storm. A leviathan will ride out waves and carry her passengers and crew safely to port when many a small craft will founder. So it is in business, and when the danger is over no one will regret that we have big ships. In business they do more than save their own people.

The power large corporations exert in time of stress comes from money. Money frequently is referred to as "hard cash," but in vast aggregations of capital there is an astonishing degree of resiliency, or ability to withstand economic shocks. When this property of money is used to protect great groups of working people during a depression it assumes a new meaning and importance. It is an insurance that really insures, and its influence extends far beyond its own organization and personnel.

The idea that large corporations are a menace merely because of their size was abandoned years ago. Now it has been demonstrated that they can be of inestimable service. There is a greater appreciation of that fact, or there should be, since the crucial test and experience in 1930.

Powerful Influences Now Being Exerted for Public Good

It was Judge Gary and some other able executives who broke down the popular misconception that large corporations exist only with evil intent. In their first great opportunity since his death his successors have shown how well such an organization may be directed to promote a purpose broadly beneficial to the public. The truth that present-day captains of industry have fine perception of their duties, responsibilities and opportunities is reflected in innumerable instances in the events of the past two years.

Take the current report of the United States Steel Corp., as an example, as it reveals an unusual amount of information pertaining to the conduct of a business employing more than 200,000 persons, and paying them about $400,000,000 a year. The chief interest in the report undoubtedly is in what it discloses as a consequence of the policy announced early in 1930 that there would be no reduction in wage rates, and "the corporation will take care of its own." In reading the report one could expect to draw his own conclusion as to the truth or falsity of those statements made a year ago.

The employes retained in service in 1930 represented the equivalent of 211,055 working full time during the year. Sometimes the actual number engaged was more than this and sometimes less. In 1929 when business was proceeding serenely and operations were at the peak the comparable number was 224,980. The reduction, therefore, in 1930 was 6.1 per cent. It is evident that the corporation could have done with considerably fewer employes in 1930 than in 1929.

Virtually all of its employes of 1929 were given some occupation in 1930. The corporation "took care of its own"; and further in the matter of wage earnings the average per day for the mechanical force, $5.80, was only 4 cents less than that for the year preceding. For the complete personnel it was the same in both years, $5.99.

Cost of Production Increases as Prices and Income Recede

Now what was the effect of this? It might lead some business men to doubt the wisdom of such management, if they did not know better. Production and prices were falling, markets becoming more restricted. The wage and salary bill ran up to 33.1 per cent of the gross receipts, whereas in 1929, with smooth-flowing operations, it was only 28.1 per cent. In 1929 this item was the lowest in relation to gross receipts in 11 years; in 1930 it was the highest in six years.

Per capita production of steel ingots dropped to 76.8 gross tons, from 97.7 in the preceding year. Per capita finished steel output was reduced to 55 net tons from 68.2 tons in 1929. The output in 1930, per employe, was the lowest in five years. Unit labor cost went up as income went down.

Only a large corporation could view this with equanimity and carry on with confidence that its labor and employment policy was fundamentally sound and best for itself and the country.

And there are many other examples, equally significant, where large aggregations of capital intelligently directed provided and continue to provide a degree of security that cannot be overestimated. Let those who are disposed to seek in large corporations a target for political shafts consider the record of 1930.

THE INDUSTRIAL DIAL

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The Business Trend Section of STEEL
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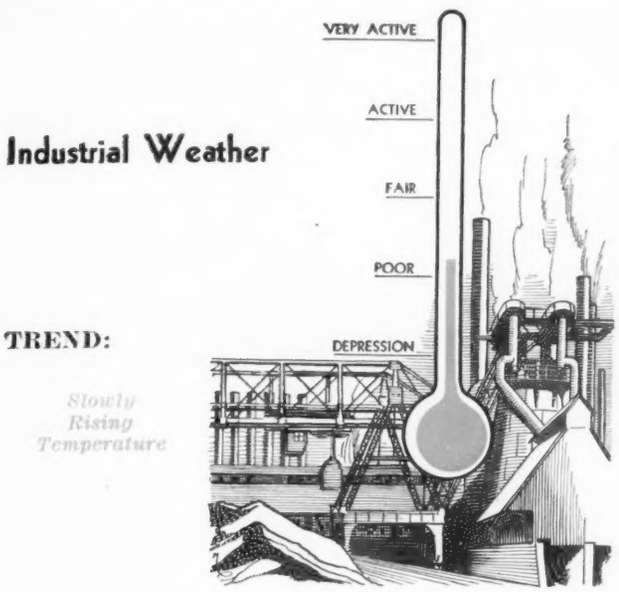
COMPLETE statistical returns for February show that business made encouraging gains over January levels. In a number of cases, the performance of basic industries was impressive, in that seasonal increments were exceeded. However, the volume of production generally was decidedly below that of February last year.

This gradual expansion of industrial activity was accompanied by a number of disturbing factors. Wholesale prices of commodities continued to slip off fractionally. Earnings statements were unfavorable. Car loadings, reflecting shipments to consumers, barely exceeded January's total.



But the entire panorama of business was brighter. Employment improved slightly—the first gain in months. Sentiment, buoyed up by favorable production records, was perceptibly better.

Activity

Production of steel ingots in February at the rate of 105,305 tons daily, represented a gain of 14.5 per cent over January. Pig iron output at the daily rate of 61,112 tons, or 10.4 per cent above the January rate, was an encouraging indicator. Seven more stacks were active on Feb. 28 than on the last day of January. Steel output was at 52.6 and pig iron output at 43.3 per cent of capacity.

Price

While the general trend of commodity prices continued downward in February, increasing signs of stability were manifest. Bradstreet's index dropped from $9.31 on Feb. 1 to $9.17 March 1. Steel's composite of steel and iron prices stood at $31.69 on Feb. 4, dropped to $31.61 Feb. 18 and remained at that level until March 18 when it advanced to $31.71. The future may show February or March marked the low point in prices.

Where Business Stands

Monthly average 1930 = 100

	Feb., 1931	Jan., 1931	Feb., 1930
Steel ingot production	82.6	72.1	117.6
Pig iron production	70.9	64.1	117.9
Freight movement	80.6	79.4	99.7
Building construction	66.6	57.9	89.9
Automobile output	78.7	60.7	118.3
Wholesale price	85.3	88.5	104.3

Demand

Increase in automobile production in February of more than 25 per cent over January was the principal change in industries which affect the demand for steel. Building contracts also showed a gain of 3 per cent. The textile industry also has shown improvement. But as in January, support for the basic industries came largely from a moderately expanding demand from numerous small sources rather than from spectacular gains in the important consuming groups.

Business Trend Charts of the Month

Production

Steel ingot production ..... March 12, p.27
Pig iron production ..... March 12, p.31
Blast furnace production rate ..... March 12, p.28
Industrial production ..... March 5, p.35
Coke output ..... March 12, p.33

Demand

Unfilled orders, U. S. Steel Corp. ..... March 19, p.27
Railroad car orders ..... March 19, p.30
Index of machine tool orders ..... March 19, p.30
Foreign trade ..... March 26, p.38
Building construction ..... March 26, p.37
Automobile output ..... March 5, p.36
Steel sheets ..... March 26, p.37
Steel castings ..... March 12, p.29
Structural steel sales ..... March 12, p.29
Foundry equipment orders ..... March 5, p. 38; March 26, p.38

Prices

Bradstreet's index ..... March 12, p.28
Iron and steel price index ..... March 19, p.28
Foundry pig iron prices ..... March 5, p.37
Iron and steel price parity ..... March 5, p.38
Basic iron—heavy melting steel ..... March 5, p.36

Miscellaneous

Freight traffic ..... March 12, p.33; March 19, p.28
Commercial failures ..... March 12, p.31
Refined copper ..... March 19, p.29
Railroad earnings ..... March 19, p.29
Iron and steel foreign trade ..... March 5, p.37

Thumb Nail Sketches of Business

Commodity Prices

Bradstreet's index of commodity prices as of March 1 dropped for the seventeenth consecutive month to $9.17. On Feb. 1 it had stood at $9.31. However, of the 13 groups of commodities covered by the index, prices of seven declined and prices of six increased. The groups in which advances occurred were livestock, textiles, metals, oils, naval stores and miscellaneous.

Automobile Production

Automobile manufacturers continued to hold to schedules and in some cases to increase them slightly. February output, estimated at 230,300, was a distinct increase over January production when the total was 178,399 units. By mid-March the weekly output of American manufacturers was exceeding 60,000 units by a slight margin.

Agriculture

More favorable weather during February has improved the outlook for crops, but against this factor stands the discouraging picture of prices of farm produce at the lowest levels since the department of agriculture began to compile quotations in 1910. Wheat prices are the lowest in 30 years, and the prospects for increases are not promising. Therefore, in general, the agricultural situation still is clouded in uncertainties.

Unfilled Steel Orders

After gaining for four consecutive months, unfilled bookings of the United States Steel Corp. on Feb. 28 were 3,965,194 tons, a decline of 4 per cent from the total on Jan. 31. Unfilled orders of Feb. 28 a year ago totaled 4,479,748 tons.

Commercial Failures

According to R. G. Dun & Co., commercial failures in February totaled 2563 companies and involved $59,607,612. This represents an improvement over the disastrous record of January, but the number of defaults sets a new high mark for February.

Blast Furnace Activity

Blast furnace output, which turned upward in January for the first time in eight months, continued to gain in February. The percentage gain of February over January was 10.4 per cent which compares with a ten-year average of 4.1 per cent. At the end of February 109 of 307 potential stacks were active. This compares with 102 of 309 on Jan. 31 and 95 of 310 on Dec. 31.

Employment

A canvass of the various employment indicators shows that in February the situation improved for the first time since October, 1929. In some cases the gains were very slight but employment experts believe that the low point has been passed.

The Barometer of Business

Industrial Indicators

	February, 1931	January, 1931	February, 1930
Pig iron output (Daily average, tons)	61,112	55,337	101,640
Machine Tool Index	73.1	65.3	172.6
Unfilled orders (Tons)	3,965,194	4,132,351	4,479,748
Ingot output (Daily average, tons)	105,305	91,971	169,930
Dodge bldg. awards in 37 states (Sq. ft.)	28,338,600	24,634,900	38,240,000
Automobile output	230,364*	178,399	345,955
Coal output, Tons	31,417,000	38,542,000	39,555,000
Business failures; Number	2,563	3,316	2,262
Business failures; Liabilities	$59,607,612	$94,608,212	$51,330,000
Cement production, Bbls.	5,920,000	6,581,000	8,162,000
Cotton consumption, Bales	433,510	454,188	494,396
Car loadings (Weekly average)	708,920	698,108	876,504

*Estimated.

Foreign Trade

	February, 1931	January, 1931	February, 1930
Exports	$226,000,000	$250,000,000	$348,852,000
Imports	$175,000,000	$183,000,000	$281,800,000
Gold exports	$14,000	$54,000	$207,000
Gold imports	$16,145,000	$34,426,000	$16,198,000

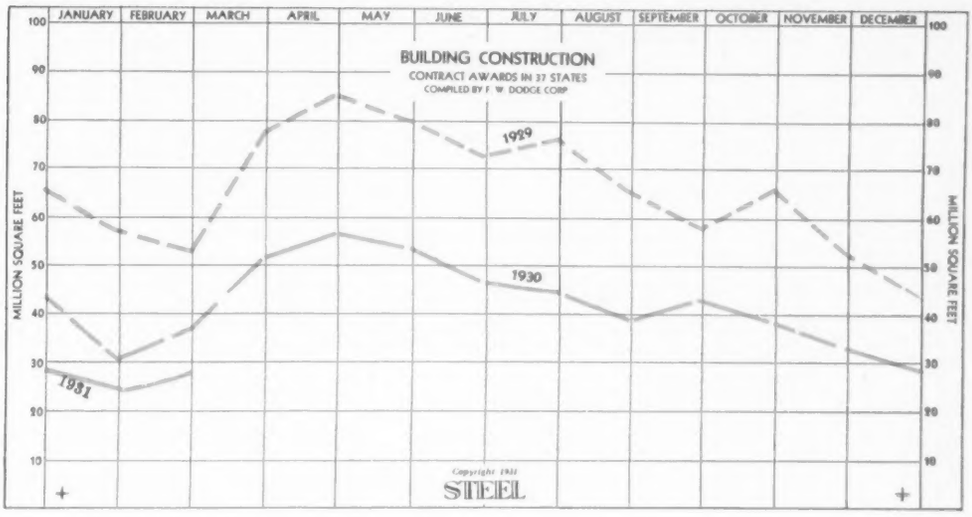
Financial Indicators

	February, 1931	January, 1931	February, 1930
25 Industrial stocks	$228.41	$215.03	$312.44
25 Rail stocks	$92.55	$88.63	$130.87
40 Bonds	$85.08	$85.00	$87.13
Bank clearings (000 omitted)	$32,664,730	$39,310,238	$41,131,987
Commercial paper rate (N. Y., per cent)	2¾	2¾	5
*Commercial loans (000 omitted)	$8,151,000	$8,374,000	$9,486,000
Federal Reserve ratio, per cent	84.1	76.3	78.0
Railroad earnings**	$33,849,116	$49,371,769	$55,454,416
Stock sales, N. Y. stock exchange	64,145,320	52,543,000	68,723,210
Bond sales, par value	$190,121,850	$264,117,000	$200,569,700

*Leading member banks Federal Reserve System.
**January, December and January, respectively.

Commodity Prices

	Feb., 1931	Jan., 1931	Feb., 1930	Mo. Aver. 1913
STEEL's composite average of 14 iron and steel prices	$31.65	$31.71	$35.24	$26.32
Bradstreet's index	$9.17	$9.31	$11.22	100
Wheat, cash (Bushel)	95c	99c	$1.34	92c
Corn, cash (Bushel)	82c	85½c	$1.01	51c
Petroleum, crude (Bbl.)	92c	92c	$1.17	$2.50



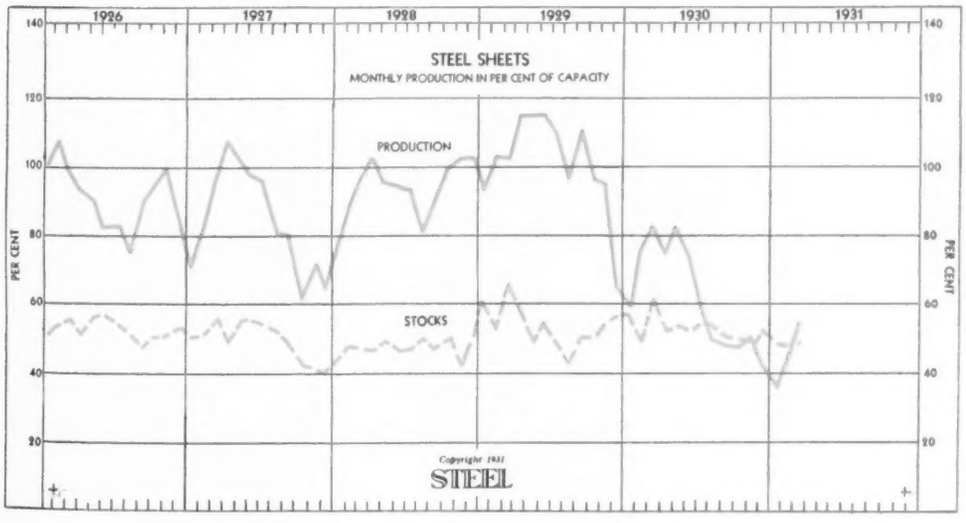
	Square Feet
February, 1931	28,338,600
January, 1931	24,634,900
February, 1930	38,240,000

Construction Awards Advance as Residence Building Turns Upward

Building construction started its spring upturn in February, and contracts awarded in 37 eastern states involved 28,338,600 square feet, compared with 24,634,900 square feet in January. The upturn was the first since last September. Of particular significance is the fact that residential construction increased for the first time in many months, going from 12,235,100 square feet in January to 16,559,300 square feet in February. Meanwhile the space devoted to industrial projects was decreasing, and from 1,620,400 square feet in January it dropped to 1,498,600 square feet in February. Total building in February last year amounted to 38,240,000 square feet and two years ago was 54,360,000 square feet.

Production and Shipments of Sheet Steel Gain in February

Independent sheet steel producers increased production in February, and at the same time shipments gained moderately. Stocks also increased, production having gained at a faster rate than shipments. February production was at 57.2 per cent of capacity compared with 45.1 per cent in January. Shipments were up to 53.3 per cent from 45.7 per cent in January. Stocks gained from 48.4 to 54.1 per cent. In terms of tonnage, February production was 192,218 tons, shipments were 179,138 tons, and total stocks were 181,614 tons. It will be noted that the rate of production has exceeded the amount of stocks again, the opposite situation having obtained practically throughout the latter part of last year.



Production
Per cent of capacity

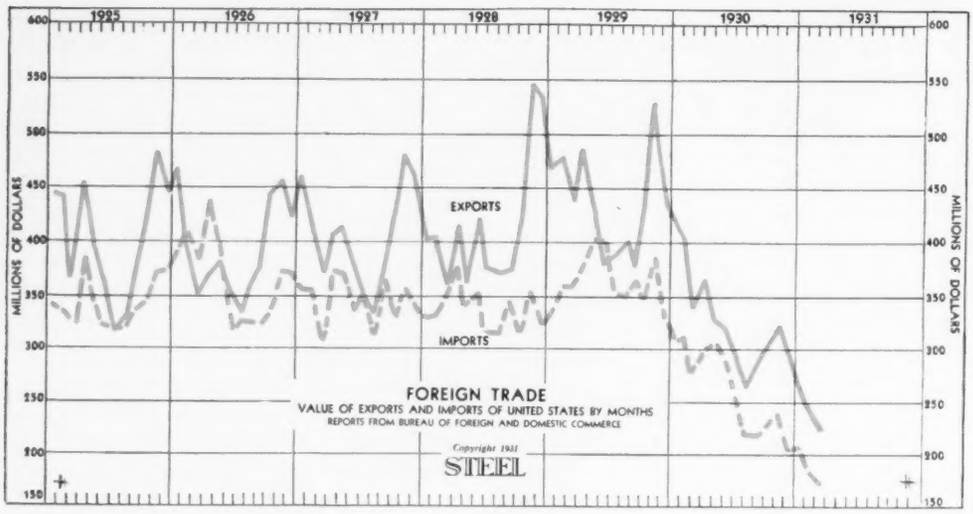
	1931	1930
February	57.2	83.9
January	45.1	77.6

	1930	1929
December	39.8	60.0
November	43.6	65.8

Stocks
Per cent of capacity

	1931	1930
February	54.1	61.4
January	48.4	51.0

	1930	1929
December	50.6	57.3
November	54.1	57.6



EXPORTS	
February, 1931	$226,000,000
January, 1931	250,000,000
February, 1930	348,852,000

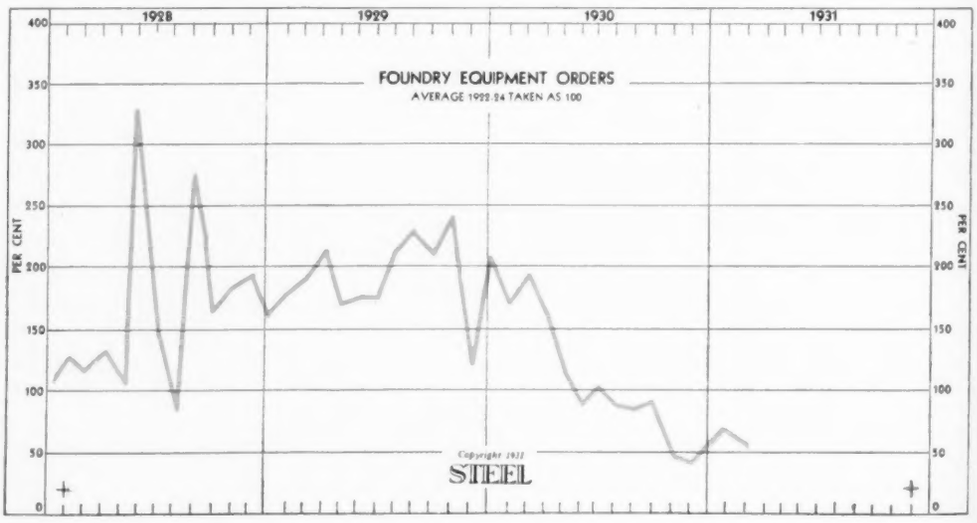
IMPORTS	
February, 1931	$175,000,000
January, 1931	183,000,000
February, 1930	281,800,000

Exports and Imports Drop Again During February

The merchandise export trade of the United States suffered further setbacks during February, and continued to descend to the lowest rate of activity in many years. Specifically, the export figure for the month, $226,000,000, was the lowest single monthly total since November, 1914, and the import total, $175,000,000, was the smallest for any month since September, 1921. The trade balance was reduced from $67,000,000 in January to $51,000,000 in February. A year ago it was $67,100,000. Although carrying foreign commerce to very low levels, the drop was more or less seasonal in nature, as the first two months of each year usually witness a drop from the fall peak of the preceding year.

Orders for Foundry Equipment Undergo Relapse

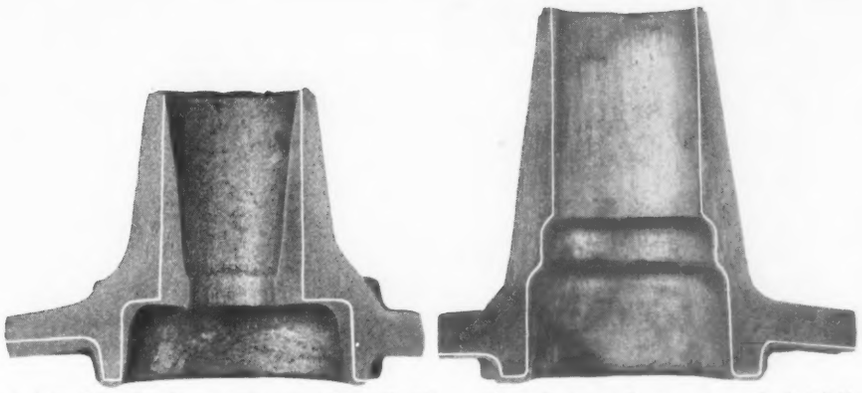
Unable to sustain the advance made during the two previous months, foundry equipment orders in February dropped off to 54.71, according to the index of the Foundry Equipment Manufacturers' association. Under January's index of 65.3 and December's index of 59.8, last month's figure still was above the low point reached in November, at 45.3. February orders were little more than a fourth of those of February in 1929 and 1930. Two years ago the index was 197.0 and a year ago, 196.4. The index of unfilled orders decreased from 94.6 in January to 93.5 in February. Shipments gained slightly, reaching 55.36, compared with 54.69 for January, the low point for shipments in recent years.



Per Cent

	1931	1930
February	54.7	196.4
January	65.3	160.1

	1930	1929
December	59.8	208.0
November	45.3	128.6
October	50.0	245.3
September	91.0	216.3



Automobile brake carrier forging (left) as forged on a hammer, and (right) as forged on the upset machine. Scrap loss was reduced from 5.18 to 2.33 pounds by the upset method. White lines indicate amount of steel which must be removed by machining

Upset Forgings Satisfy Demands of Quality and Economy

BY E. TONKIN, Engineer
Union Switch & Signal Co., Swissvale, Pa.

PROGRESSIVE forge shops today are producing parts which several years ago were considered commercially impractical. No longer do deep holes, unequal cross sections or irregular contours prohibit forging, and no longer is it necessary to allow excess draft and an excess of metal for finish to be machined away.

To obtain the best results from gears, engineers require the grain flow of the metal to be outward in radial lines from the center of the gear. This result is obtained by upsetting the stock either on a hammer or upset machine. In the forging division of the Union Switch & Signal Co., Swissvale, Pa., are modern upset or forging machines as made by both the Ajax Mfg. Co., Cleveland, and National Machinery Co., Tiffin, O., to satisfy the most exacting customers' requirements as to grain flow, minimum finish without draft, deep holes to eliminate drilling, and forgings of intricate design.

Accompanying illustrations show a number of forgings, some made in a hammer and some in an upset machine. All are sectioned and etched to reveal the grain flow. Reductions in weight of the upset forgings compared with the same parts hammer forged, point to appreciable savings in freight charges, when it is considered that these parts are often shipped in lots of 20,000 to 30,000. In addition to this saving, the reduction in the amount of machining necessary on upset forgings in the shop indicates further economies. Several examples, not illustrated, can be mentioned to show weight savings effected. A compensating gear for an automobile differential as forged in a hammer with draft and without hole weighed 3.30 pounds; the same gear forged on the upset machine without draft and

MANY difficult forging problems have been met by the use of the forging machine, or upset machine, as it is sometimes called. Forgings with irregular contour, unequal cross sections, thin walls, holes that must be concentric, true and free from draft test the skill and ingenuity of the forger. In the accompanying article, one manufacturer points out the economical advantages and high quality of forgings made on the upset machine.

FROM left to right, sliding gear for transmission as forged on hammer with draft and without hole, weight 3.50 pounds; the same gear as forged on the upset machine without draft and with hole pierced in forging, weight 3.30 pounds; idler gear as previouslly forged solid on upset machine; and same gear as now forged on upset machine with hole pierced from end to end and held central in forging. All are sectioned and etched to show grain flow

with hole pierced in forging weighed 2.77 pounds. A first-speed transmission gear, hammer forged with draft on the outside and draft in the hole, weighed 2.66 pounds; the same part forged on the upset machine without draft on the outside and with hole pierced weighed 2.22 pounds.

An automobile brake carrier forging, formerly forged on a hammer, now is made on an upset machine, the upset carrier showing a saving in metal. Sections of this forging, made by both methods, are shown in the illustration on Page 39, the upset forging being shown at the right. Sketched white lines indicate the general outline of the parts after machining and reveal the substantial reduction effected in amount of metal that must be removed from the upset forging. Dimensions of the upset forging closely approach those of the part after machining. The hole is straight and lacks the large draft noticeable in the hammer-forged piece, corners are well filled and an ideal grain flow is revealed.

The piece is 6¼ inches long, with hub diameter of 6 9/16 inches, interior diameter at the neck of 2⅛ inches and at the base of 3 inches. The inside diameter of the intermediate is 2 3/16 inches.

Scrap Loss Reduced

Savings in the present forging operation consist largely of the reduction effected in amount of material required. The new carrier, weighing 12.14 pounds, is 1.34 pounds heavier than the old product, but the incidental scrap loss has been reduced from 5.18 to 2.33 pounds. Thus it is seen that less metal, by 1½ pounds, is required to produce the larger piece. The scrap loss formerly occurred in the flash resulting from the drop forging operation. Present practice incurs no flash, the scrap being represented by a short length of bar required for a tong hold.

In present practice a standard 5-inch upset machine built by the National Machinery Co. is employed. Four passes or upsets are required to make this forging, as shown in the sketch of the die box on Page 41. The first upset stoves up the end of the bar; the second upsets the flange and forms the six bolt bosses and starts the holes. The third upset forms the flange and bolt bosses to size and also fills out the corners, builds up the sleeve and finishes the hole, leaving only the straight part to be pierced; the fourth and last upset cuts the forging off the bar as the dies close and, as the tool comes up, finishes piercing the hole, completing the forging.

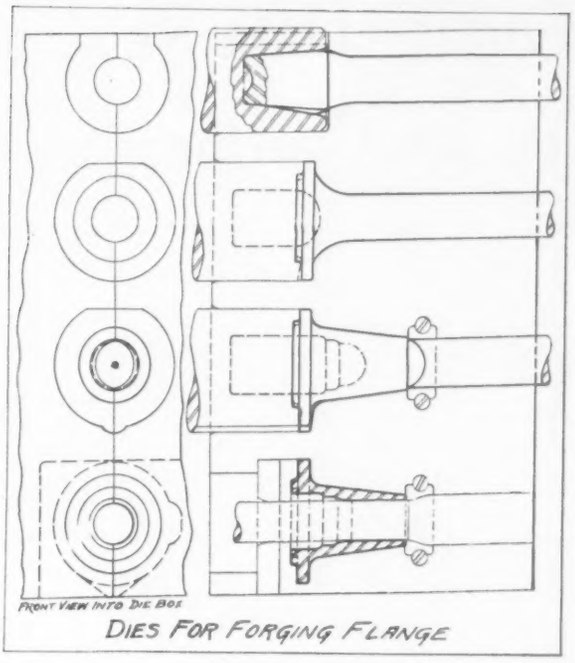
Bars of 2½-inch round S. A. E. 1035 steel, cut long enough to make

FROM left to right, driveshaft flange as forged on hammer with draft and solid, weight 3.97 pounds; same part forged on upset machine without draft and with hole pierced, weight 3.10 pounds; a transmission gear forged on upset machine without draft and with hole pierced from end to end; bevel gear similarly forged, without draft and with hole pierced. Sectioned and etched to show grain flow

six forgings and leave a tong hold for the last piece, are used. These bars are worked at a temperature of about 2200 degrees Fahr. Each forging requires 11¾ inches of the steel bar.

The material used in the manufacture of the gears illustrated is of alloy steel of the specification required by the customer for either transmission or differential.

In heating alloy steel it is necessary to use extreme care to not overheat the material and to prevent forming excess scale which is prohibitive when the finish is reduced to a minimum as it is in this type of work.



DIAGRAMMATIC sketch of four progressive dies in die box of upset machine, used in forming brake carrier forging

DIES FOR FORGING FLANGE

Vibration Is Negligible in 102-Story Building

From tests thus far made, the new 102-story Empire State building in New York appears to be almost without vibration. During the recent windstorm of March 8 instruments placed on the topmost platform of the tower showed even a slighter vibration than many buildings of much smaller height. Even in the severe wind, the worst in years, no vibration was perceptible without instruments.

The research work is being conducted by Prof. C. D. Morris, Ohio States university, Columbus, O., and D. C. Coyle, structural engineer, New York. One of the purposes of the tests is to obtain data which may be used for the design of lighter buildings with glass walls and thinner floors.

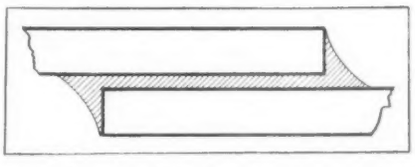
Soldering 18-8 Steel Involves Fillet on Front and Rear of Seam

BY KENNETH T. MAC GILL
Joseph T. Ryerson & Son Inc., Chicago

WITH the advent of 18-8 stainless steel as an important commodity in industry, the problem of soldering the metal has been given much consideration. The process is not difficult. Soldered joints have shown as high as 8000 pounds per square inch on tensile pull tests.

A knowledge of the physical properties of the steel and the solder is a help in overcoming any difficulty encountered in joining this metal. Some of the properties which make this commodity so desirable to use, such as its resistance to chemical action and its low ratio of thermal conductivity (being only 48 per cent of iron) are opposed directly to the properties which make ordinary soldering easy.

The strength of a soldered joint is built up to a large extent by the fillet which should be formed on the back of the seam as well as the front where the soldering iron is in contact with the metal. To secure



A strong soldered joint will result if a fillet is formed at the seam where the soldering iron is in contact with the metal

such full penetration it is necessary that the full width of the seam be heated to a point above the complete liquidation point of the solder. Appreciating the slowness with which the metal conducts heat, it is obvious that to make a joint, using ordinary grades of solder, either higher heat must be used on the soldering iron, or the travel of the soldering iron slowed, to give sufficient time for the full width of the seam to attain the proper temperature.

Both methods are objectionable because they make the operator deviate from the usual practice, and unless he is unusually skilled the work is apt to be faulty. To overcome this special solders have been developed. These not only have more strength than the ordinary grade, but are completely liquid at lower temperatures. The temperatures used in ordinary soldering heat the entire width of the seam to a point where these new solders will penetrate the seam and form the necessary fillet on the reverse side, as shown in the accompanying sketch.

No Oxide or Grease

To secure these results, it is understood that the parts to be soldered are free from oxide and grease, otherwise the solder will not adhere. On account of the high resistance of the 18-8 metal to chemical corrosion, ordinary fluxes do not properly etch the surface, so a special flux has been developed which accomplishes this result. On account of the tendency of flux acid to attack the stainless metal it is necessary that the workman, when the job is completed, thoroughly wash all surfaces with a soapy or soda solution in order that the finish of the metal will not be spoiled.

Tests have shown that a soldered joint with 1/64-inch of solder between the surfaces has much greater strength than a job where the surfaces only are sweated together. It is evident that if the two surfaces to be soldered are clamped together tightly, neither the flux nor the solder can penetrate. Care should be taken if the two pieces must be clamped that a thin spacer or a slight crimp is put in the metal at the point where the clamp is placed to insure sufficient space for both the flux and solder to penetrate.

Further Data Required on Tough-Hardness of Steel

BY E. F. LAKE
Consulting Metallurgist, Marysville, Mich.

ENGINEERING literature and data are replete with figures on tensile properties and the hardness of steel, and the strength of parts is usually based on them; but, to provide a steel part which will last a long time and resist strains and stresses to which it is subjected, the property of tough-hardness is one that is needed primarily and engineering data are meager on this point.

Elastic limit is usually relied upon for determining the strengths of steel parts, but that only furnishes a rough guess as to the more important tough-hardness. Therefore, the factor of safety (or ignorance) must be made so high that the parts are often larger and heavier than they need be, especially when made from high-grade alloy steels. The importance of weight and size has been amplified since aircraft came into practical use, demanding extreme lightness in all parts.

Hardness Another Indication

Hardness, as measured by the scleroscope and brinell machines, also has been used as a measurement of the property required in steel for long wearing service. But neither high nor low hardness figures give much indication of what steel parts will be the toughest, best wearing, or longest lived. Such data find their best application in checking heat treating operations.

It is known that the hardest steels are the most brittle and when used for such articles as bearings or gears, do not last as long as when some of the hardness is drawn out to reduce this brittleness and increase the toughness. Few steels used for engineering purposes are subjected to tensile strains alone; therefore, they must have the dual property of tough-hardness further to resist torsional strains, bending strains, vibrational strains, or any fatigue-resisting strains. Engineering data need to be more prolific in figures indicating tough-hardness and widening knowledge of the strains and stresses any given steel will resist. Such data would permit reducing the factor of safety and designing steel parts with light weight, suitable to aircraft.

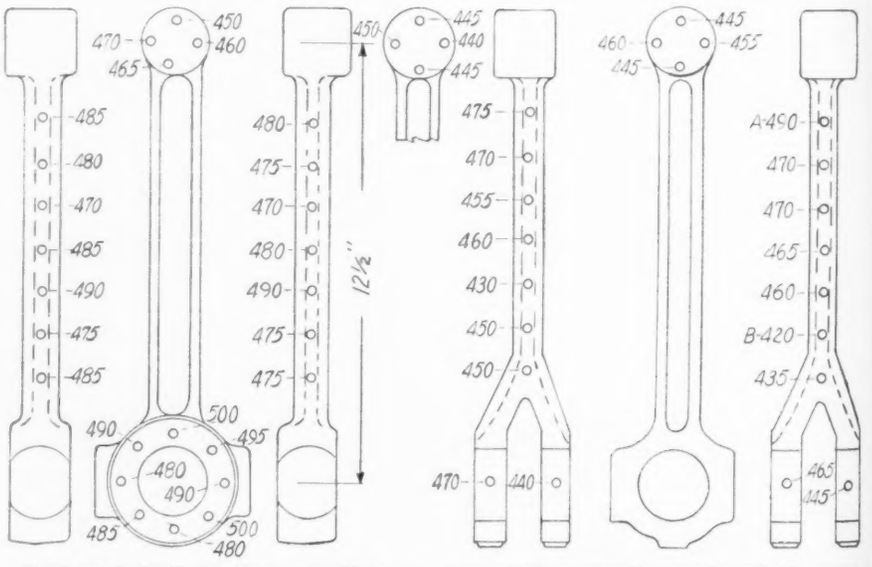
Glass, of course, is harder than steel; yet it can be cut and reduced to any desired size by filing, even though it is harder than any file. This is due to the fact that hardness generates brittleness and the glass breaks up into fine particles and crumbles away under the action of the file. Steel, in its hardest state, crumbles away in practically the same manner, but to a much lesser degree, when used in such instances as gear teeth or where two parts rub together, as in bearings of any type. Thus hardness alone is rarely the desired property.

It is common practice to test for hardness such moving parts of machinery as crankshafts, camshafts, gears, pistons, etc., when knowledge of the wearing properties is sought. This calls for a knowledge of the tough-hardness of the metal, and the hardness test gives at best a roundabout and uncertain estimate of the tough-hardness. For instance, experience has shown that a certain steel will give the greatest amount of wear if it is heat treated in certain ways. After hardening and tempering, the hardness tester is brought into use to indicate whether the brittleness has been drawn out to give the desired degree of toughness; this being judged by the hardness figure obtained from the scleroscope or brinell reading. A true indication of toughness is not given.

Bronze gears have been found to outwear steel gears when running in mesh with them, yet hardness testing would indicate that steel gears were the better. A similar example is manganese steel; when gears were made from this steel and subjected to the severe grinding action of the mineral dust encountered in stone crushers, they outwore three or four times gears made from any other type of steel, no matter how the latter were hardened and tempered. Yet hardness testers would give a higher hardness figure for the common carbon steel gears, hardened and tempered properly. Manganese steel makes one of the toughest and best wearing alloys known and still its static and dynamic properties are not as great as those of other alloy steels. Hence it cannot be used for engineering parts that require high static and dynamic properties; nor does its machinability commend it to use for such parts. Lighter weight and smoother surfaces can be obtained in parts made from other steels.

Wide Variations Noted

Hardness testing machines are not so accurate they will not give different readings on two successive operations performed as near each other on the test piece as will prevent the deformation of the metal from the first operation from influencing that of the second. It is difficult, if not impossible, to check one machine with another when both are of the same type, and much more difficult when the two are of different types. This is because the test cannot be performed twice on the same spot, since the first operation bruises the steel in a way that would affect the result obtained by the second test. Too much reliance cannot be placed on readings that are taken a sufficient distance apart to get outside the range of these so-called bruises,



Various brinell hardness readings on two steel connecting rods which were heated in a lead bath, quenched in mechanically cooled oil and drawn at closely controlled temperatures

All shafts of this giant Farrel-Birmingham gear reduction unit are mounted on Timken Bearings

Here is another outstanding example of the ability of Timken Bearings to lick the steel industry's toughest jobs.

This double reduction gear drive was built by the Farrel-Birmingham Company, Buffalo, N. Y., for the Allegheny Steel Company, and transmits power from a 1600 H. P. 360 R. P. M. motor through two pairs of gears having a reduction of 12 to 1.

Both the high and low speed shafts are mounted on Timken Bearings, thus providing modern anti-friction efficiency with full protection against radial, thrust and combined loads.

Day in and day out, Timken Bearings are saving power and lubricant, preventing wear, lengthening machine life and cutting maintenance costs to the bone in all types of equipment throughout the steel industry . . . on mill roll necks, mill drives, transfer tables, hot and cold saws, mill motors, traveling cranes and other machinery.

Timken performance on roll necks is one of the wonders of the industry. It has completely upset all previous standards of rolling mill costs with power savings as high as 50% and an average bearing life thousands of tons longer than that of any plain bearing. The Timken Roller Bearing Co., Canton, O.

TIMKEN *Tapered Roller* **BEARINGS**

as it seems impossible to get a uniformity of hardness over an entire surface.

This is best illustrated by two connecting rods which were brinell tested over their surface, with results shown in the accompanying illustration. These rods were heated for hardening in a lead bath with an accurately controlled temperature; then quenched in oil kept cool mechanically; and finally drawn at temperatures varying less than 5 degrees from a given level. Thus they should have been uniform in hardness; but a variation of 20 points in two test spots just 1 inch apart was noted on the piston end; 20 points on the shank of another rod next to the piston end; 30 points between the two forked crankshaft bearings, and 70 points between locations *A* and *B* on the opposite ends of one shank. Seldom were two readings alike that were side by side.

Fatigue Resistance a Factor

This variation tends to prove that testing for hardness gives little indication of the tough-hardness that is so much desired when designing parts requiring the greatest endurance with extreme lightness. At present, probably the best indication of this property can be obtained from test readings on the Upton-Lewis type of fatigue testing machine, as that property would be the greatest factor in the resistance to fatigue, Some engineers use reduction of area as a criterion of the tough-hardness with fair results, while others use it in combination with elongation, or elastic limit, or both.

Impact tests, either of the Charpy or Fremont type, give a good indication of the toughness that is a property of the softer steels but not the tough-hardness that is desired for such parts as gears, crankshafts, connecting rods, etc. This is shown by the fact that the highest impact figures are obtained when the steel has been hardened and then drawn at a temperature of 1300 degrees Fahr. From a drawing temperature of 500 to one of 900 degrees Fahr., a gradual decrease in impact test figures occurs and from 900 to 1300 degrees Fahr. a gradual increase is noted. Steels which are cooled slowly in a furnace give higher impact readings than those cooled in air or quenched in water; the water quenched steels being the lowest. This is the direct opposite of the readings obtained with a brinell hardness tester.

Steels for use in moving parts of machinery usually show best results when hardened correctly and drawn at temperatures between 700 and 800 degrees Fahr. A microscopical examination will show that the martensitic structure of hardened steel has been entirely replaced by troostite and at 800 degrees Fahr. the sorbitic structure has just begun to appear.

Some metallographists have given the name osmondite to the structure that appears in the transition between martensite and sorbite, or at the drawing temperature of 750 degrees Fahr. This is difficult to locate, however, as it does not cover as wide a range of drawing temperatures as any of the other grain structures and its existence is sometimes doubted. It appears at the moment when the last trace of martensite has disappeared and before the sorbite has begun to show.

While desired properties can be determined with the microscope, they cannot be transformed into figures that will facilitate the design of a part of the smallest sectional area and weight that will resist a given load.

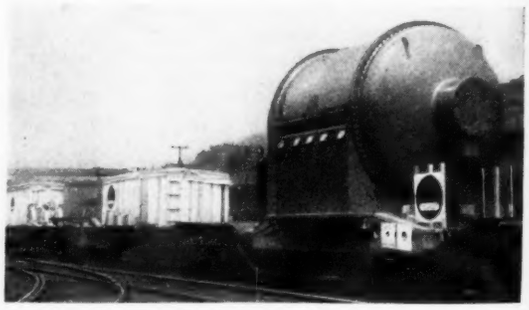
The finer the grain of a steel, the greater will be its tough-hardness. As chromium refines the grain of steel more than any other element, this property of tough-hardness is greater in the chromium alloys than in any of the other metals or alloys. This is also true of other physical properties, either static of dynamic. An addition of nickel still further increases the physical properties as it neutralizes the mineral hardness produced by the chromium and makes the alloy more easily machinable. It also reduces the grain to one that is more amorphous. This gives the chrome-nickel steels a tough-hardness that is greater than can be found in any of the other straight or alloyed steels.

The manner in which steel is mechanically worked also has an effect on the physical properties. Forging refines the grain and gives the metal greater tough-hardness, strength and fatigue resistance.

While many revolutionary improvements have been made in metallurgical practice and alloys in general during recent years, none has yet equaled this 50-year old chrome-nickel steel in tensile strengths, torsional or bending resistance, fatigue resistance and the combination property of tough-hardness. In brinell hardness tests chrome-nickel steels also give high figures; consequently, parts which must have high physical properties can be made small and light from chrome-nickel alloys. All that appears to be lacking is more knowledge and data on which to figure this tough-hardness factor together with the other physical properties, thereby permitting the factor of safety to be reduced to a minimum.

Hydrogen Gas Is Used To Cool Large Synchronous Condenser

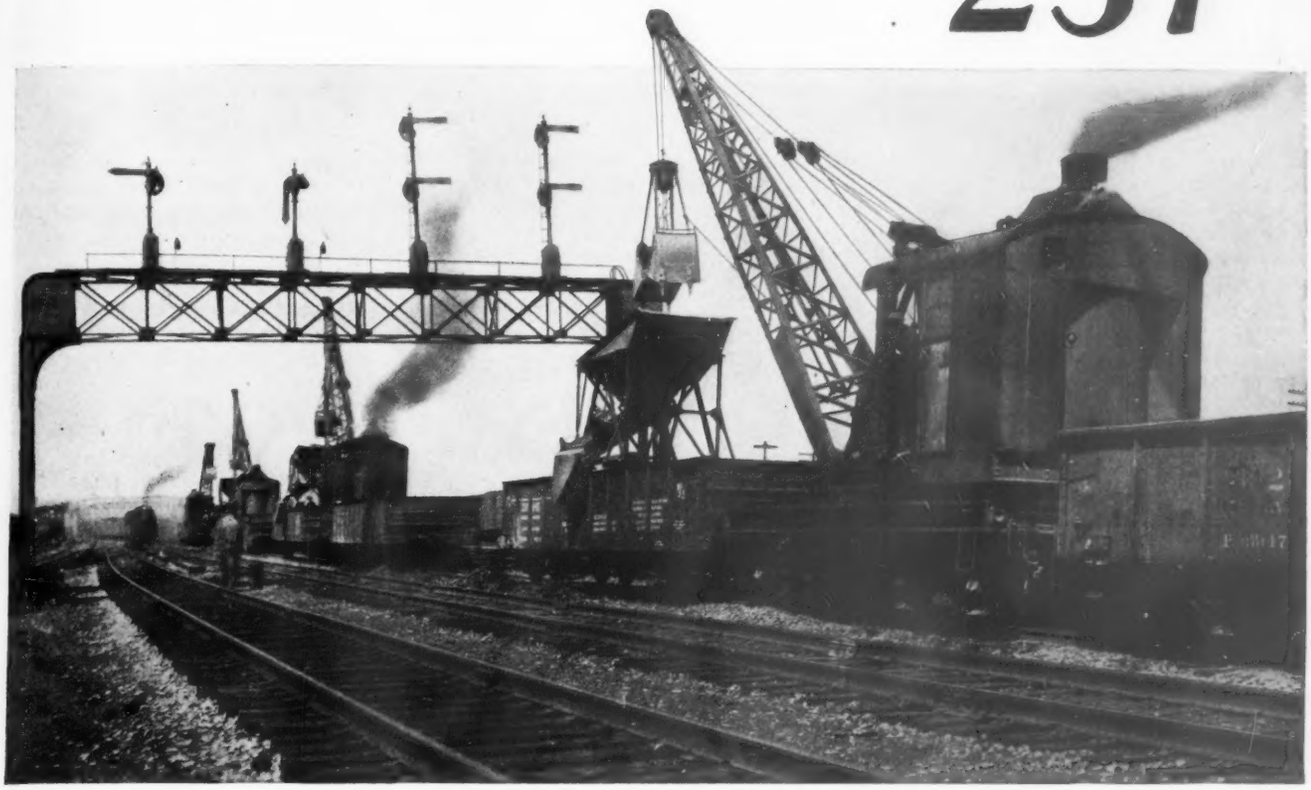
AN UNUSUAL cooling system making use of hydrogen gas instead of air is used on the new synchronous condenser that is to be connected through transformers to the transmission lines of the Southern California Edison Co., Los Angeles, for automatic regulation of the voltage on transmission circuits. This machine, built by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is rated at 15,000 kilovolt amperes, and 11,500 volts. Many advantages have been gained by the use of hydrogen instead of air. The output of the machine is increased about 25 to 30 per cent above that for operation in air, while the power consumed in losses is considerably reduced. The damage to insulation arising from static discharge is practically eliminated. The hydrogen is water cooled, the coolers being located within the machine. The collector rings and brushes are in a small chamber at one end of the machine and these may be inspected through small glass windows or when the machine is shut down, this end may be removed without affecting the hydrogen within the condenser.



Hydrogen filled synchronous condenser ready for shipment to California where it will be installed on the lines of the Southern California Edison Co.

In filling the condenser with hydrogen, an inert scavenger gas is used to expell all of the air. After the condenser is filled, an explosion is impossible even though there were some source of ignition. Nevertheless, the machine is made explosion proof. The pressure inside is maintained above atmospheric so that any leakage will be outward.

PENNSYLVANIA RAILROAD HAS PURCHASED 237



Twenty-five ton capacity steam locomotive cranes cleaning track ballast.

LEAVING the crowded seaboard cities behind, the Pennsylvania Flyers take you speedily across the plains and through the beautiful wooded valleys of the Appalachians. These luxuries and punctual schedules of modern travel did not just happen. They are the visible evidence of scores of perfectly co-ordinated units, in which we take pride that Industrial Brownhoist locomotive cranes have had a part for nearly forty years.

Cleaning track ballast, coaling locomotives, laying rails, clearing track obstructions and doing the heavy handling on many kinds of construction work—these are only a few of the many jobs for which the Pennsylvania Railroad uses Industrial Brownhoist cranes. Two hundred and thirty-seven locomotive and crawler cranes make up this one road's fleet and the cranes are of many different types, ranging from 7½ to 150 tons capacity.

Industry today demands machinery which will show a substantial profit. In railroad service or your own, if you have materials to handle, an Industrial Brownhoist crane will quickly pay for itself. Our long experience has enabled us to help thousands of companies reduce their material handling costs. May we be of similar service to you?

Industrial Brownhoist Corporation, General Offices, Cleveland, Ohio

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INDUSTRIAL BROWNHOIST

Methods, Materials Subjects at Welding Symposium

A SYMPOSIUM on welding attracted nearly 700 to the regional meeting of the American Society for Testing Materials, held March 18 in Pittsburgh at the William Penn hotel. K. G. Mackenzie, president of the American Society for Testing Materials, and G. H. Danforth, past-president, Engineers Society of Western Pennsylvania, presided.

Discussion of various welding methods appropriately opened the program. A paper on "General Survey of Welding Processes," presented by F. T. Llewellyn, United States Steel Corp., New York, classified these different processes, describing the procedure followed in welding by the different methods included under the general divisions of plastic and fusion welding. A chart was prepared to illustrate these different practices as well as the characteristics of each.

Gas Torch Used Widely

The gas torch is most commonly employed in the welding of aluminum, the electric-arc method still having some limitations in its application despite its growing importance in that industry, according to W. M. Dunlap, metallurgist, Aluminum Research Laboratories, New Kensington, Pa. Oxyhydrogen and oxyacetylene are the most widely used gases, the former being preferable for welding material ⅛-inch or less in thickness. Either a neutral or slightly reducing oxyacetylene flame should be used for welding heavy-gage sheet and plate. Use of the metallic arc is more extensive than of the carbon arc, but care is necessary to prevent porosity in the welds. Advantages in use of metallic-arc welding are low cost, freedom from warping and distortion in stock being welded, and relative ease of breaking in new operators. When applicable, arc welding is cheaper than the gas process. Electric-resistance spot welding is finding growing application.

Discussion on "The Quality of Materials for Fusion Welding," prepared by C. R. Texter and F. N. Speller, department of metallurgy and research, National Tube Co., Pittsburgh, pointed out that the choice of materials for welding apparently does not depend so much upon the process employed as upon the welding technique and the careful control of contributing factors such as temperature and pressure, in the case of plastic welding; speed and current density, in the case of electric welding; kind of flame and its proper manipulation, in the case of gas welding; flux used, etc. The ideal welded joint obviously is that one in which the properties of the weld metal and the base metal are similar both chemically and physically. The percentage and character of nonmetallic inclusions in steel probably influence the ease of fusion welding and also the soundness of finished weld. For this reason it is thought that open-hearth steel is better than bessemer steel and firebox quality more adaptable than structural quality. Nevertheless, with care and experience any of the commercial grades of steel can be welded satisfactorily.

Speaking of the problem of making the weld of corrosion-resisting material immune to corrosion as well as a satisfactory union, the authors recommended the keeping of the carbon as low as possible, use of heat-treatment and the removing of the welding scale.

Designers of welded products should be concerned with the use of as few individual pieces as possible rather than attempt exactly to replace a casting or a riveted product with so many duplicate pieces of steel, welded together, it was stated in a paper on "Modern Applications of Arc Welding," presented by A. M. Candy, welding engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. A number of illustrations were shown of welded equipment, the design of which was altered considerably from former practice but which proved more satisfactory and lower in cost. Design of bridges and buildings for welded construction was discussed and illustrated by slides. Advantages of use of automatic arc welding equipment were described in connection with the building up of car wheel flanges and worn axle collars as well as in other practices.

Developments Reviewed

Recent developments in gas welding and cutting were described by E. J. W. Eggers, development engineer, Linde Air Products Co., New York. These included the use of gas in welding various tubular products and in the aircraft and other industries. Automatic gas cutting machines for producing various shapes from plates also were discussed.

The stethoscope offers a practical and valuable means of making a nondestructive test of the quality of welds, it was stated in a paper by J. R. Dawson, metallurgical engineer, Union Carbide & Carbon Research Laboratories Inc., Long Island City, N. Y. This instrument facilitates testing particularly on those jobs where use of the X-ray method is inconvenient and in supplementing examinations by the latter. Stethoscopic examination consists of listening to the sound caused by the vibrations set up through striking the weld with a hammer. Parts of the weld free from defects produce a similar sound, while as the portion of the weld containing a discontinuity is approached, a high-pitched, reedy sound will be increasingly noticeable, and the defect can be located.

X-ray tests of welds were described in considerable detail by Col. G. F. Jenks, Watertown arsenal, Watertown, Mass., photographs of a number of X-ray pictures of welds were shown and portions of proper and incomplete fusion between the joined portions pointed out.

Other Tests Explained

Other valuable nondestructive methods of testing welds were discussed by T. R. Watts, research engineer, research laboratories, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in a paper on "Magnetic Methods of Testing Butt Welds." The magnetic method employs an electromagnet and iron filings for tracing the electric field or flux of the weld. This process is based on the fact that faults in welds increase their reluctance and at flux densities from about 13,000 to 15,000 gausses the differences between good and poor welds, of similar type and size, are detected easily. For detecting faults far below the surface of welds and minor defects a meter has been developed that operates on the principle that a bad weld has a greater magnetic potential drop between two points than between two similar points of a good weld of the same type and materials. These methods are satisfactory only for butt welds and are most suitable for detecting imperfections near the surface.

Fatigue testing is an effective method for determining the quality of a welding process when used in conjunction with the development of welding and the setting of a procedure control in the welding shop, but to apply it to each individual heat of steel going into service is prohibitive because of the cost and time involved, according to T. M. Jasper, director of research, A. O. Smith Corp., Milwaukee. Fatigue tests have their place in determining the value of various methods or designs but not as a system of wholesale inspection. In regard to impact tests the author stated that the weld for a particular service that will test high-

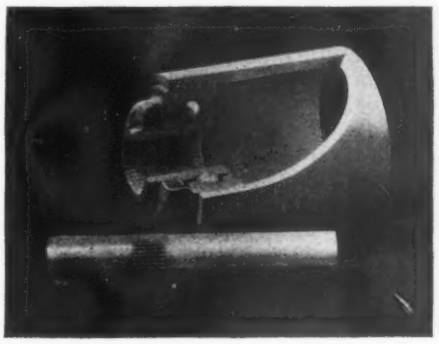
(*Concluded on Page* 53)

Uncover those tell-tale handling figures

Electric ranges are heat tested as they move over a pallet section of the Mathews Conveyer System in the Edison G. E. Plant

IT'S ten to one you will never know what your handling costs totalled last year—whether or not your plant was one of the thousands in which the cost of *inside* handling practically equalled the entire cost of moving finished products from shipping platform to their markets. The figures are in the books, no doubt, but so hidden that the world's best statistician could never sift them out. This month, this year, however, can be made to tell a different story. Tabulate handling costs in their own column. Study them just as you would a plant production record. It's twenty to one you will recognize the need of improved methods—of a modern conveyer system engineered to bring about more speedy, economical handling. That system, if you would have maximum conveying efficiency, at minimum cost, should be a Mathews Conveyer System.

Only Mathews has the Gearlock Cone and Axle—In ordinary roller conveyer, used as gravity carrier or as the bed for belt sections, movement between the bearing cone and the axle often occurs when shock and weight have loosened the connection. This lost efficiency is impossible in Mathews Roller Conveyer because of the patented gearlock cone and axle which firmly unite these two parts, yet permit easy detachability. This modern feature is clearly pictured in the cutaway illustration of Mathews Type 52A Bearing shown at the left. The axle is knurled, the inside of the cone accurately broached, thus providing a very simple, yet most positive lock.



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Diffraction Patterns Explain Metal Crystal Structures

BY R. L. DAVIDSON
American Rolling Mill Co.

ANSWERS to many baffling questions regarding crystal structures of metals are being divulged through expert adaptation of X-ray analysis. The accompanying article, written for the man who is entirely unfamiliar with any details of X-ray work, describes in an elementary manner what the X-ray reveals and how the information is interpreted. The author, R. L. Davidson, is associated with the research division of the American Rolling Mill Co., Middletown, O.

TWENTY years ago chemists and metallurgists possessed what they thought to be a rather complete knowledge of what steel was. They could measure the properties which made it a useful metal and could show under microscopes how what appeared to be a homogeneous material was in fact made up of numerous small grains. But only with great uncertainty could they have guessed that they were soon to become familiar with the atomic architecture of those small grains.

It was the discovery that X-rays were merely another form of radiation, differing from light, heat, and wireless waves only in their much shorter wave-lengths, which set scientists to searching for new applications of this invisible light which had the ability to penetrate solid objects.

Early Predictions Made

In 1912 Laue predicted that solid crystals should be able to diffract X-rays in much the same fashion as a prism spreads sunlight into a rainbow of colors. The subsequent confirmation of this prediction opened the door for two complementary types of research—the investigation of X-rays by means of crystals and of crystals by means of X-rays. It was by the latter means that the true inner structures of steel and other metals were determined.

The structure revealed was both remarkably simple and beautifully symmetrical. A representation of the arrangement of iron atoms within each grain of pure iron is shown in Fig. 1. The whole plan can be seen to be that of a great number of cubes piled evenly together. Wherever cube corners meet an iron atom is located; and an additional one is found in the center of each cube. Of course no actual cubes are there, no lines connecting the atoms, nor do the atoms appear as in the diagram. This is merely a conventional device to represent how the atoms are arranged with respect to one another in a piece of metallic iron. This pattern of which only a small portion is shown, actually is repeated millions of times in all directions within a single crystal-grain with the same precise uniformity.

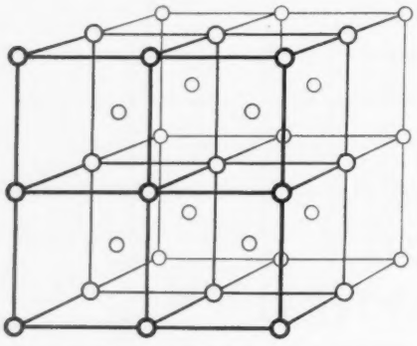

Fig. 1—Representation of the iron atoms within each grain of pure iron

X-Ray Beam Diffracted

One of the many methods by which X-rays can be made to disclose the inner structure of all kinds of crystals is similar to that originally suggested by Laue. Fig. 2 shows the method generally used in the research laboratories of the American Rolling Mill Co., Middletown, O. Here a small X-ray beam, made to fall upon the specimen to be examined, is bent from its path (diffracted), and is registered on a photographic plate set up a short distance away.

Fig. 3 shows a typical X-ray diffraction pattern made by this method. The specimen in this case was a well annealed sheet of ingot iron in which condition of the iron could be said to be one in which a large number of perfectly and regularly constructed crystals were assembled in random fashion. This condition is called by X-ray metallurgists *random orientation*, and the degree to which it is attained affects markedly the manner in which the sheet behaves, especially if it is to undergo a drawing operation.

Through the aid of the X-ray it has become well understood what happens when a sheet of ingot iron is rolled. The tremendous pressure of the rolls causes portions of these cubic structures to yield and slide over the rest, sometimes keeping the cubic structure of this newly formed fragment in line with its parent crystal and sometimes rotating it until it eventually becomes a separate crystal.

Slippage Along Planes

But this slipping of portions of crystals is not at all confined to the six faces of the imaginary cubes. From inspection of the atomic arrangement shown in Fig. 1, it will be noticed that all the atoms seem to lie in layers parallel to each other and at equal distances apart; also that there are many different sets of layers of atoms, some running diagonally through the series of cubes and some at peculiar angles, similar to the manner in which the trees in an orchard occur in many rows other than those rows which are parallel to the fences.

Crystallographers have named these layers *atomic planes*, and the various sets of parallel layers, *plane families*. Further examination of this cubic *lattice*, as it is called, will reveal that the atomic planes in different plane families are different distances apart. This fact is of direct importance in understanding X-ray patterns shown in Fig. 3 and Fig. 4.

Returning to the examination of what happens to a sheet during rolling, it is now easy to see that it might be reasonable for a crystal-grain to deform by having its parts slip along each other on any one of these atomic planes. This is true but certain planes have been discov-

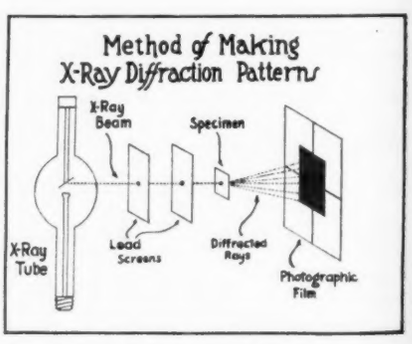

Fig. 2—Setup for making X-ray diffraction patterns of metal specimens

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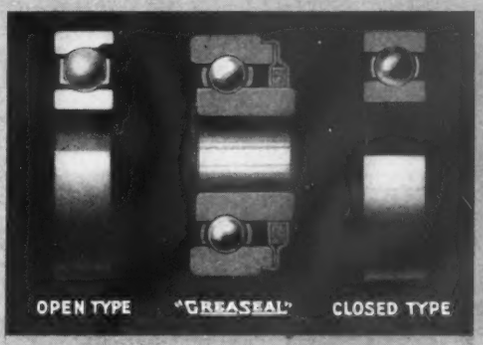

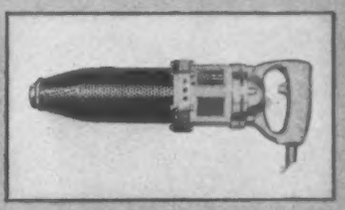

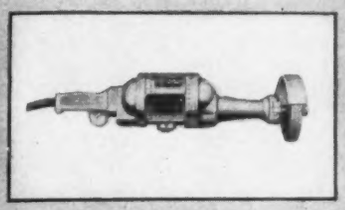

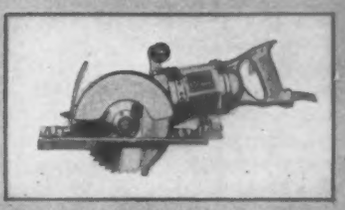

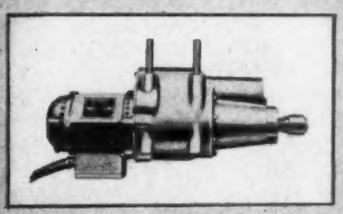

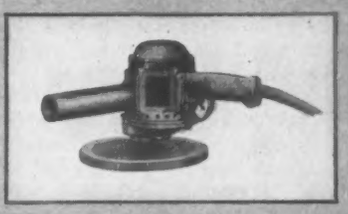

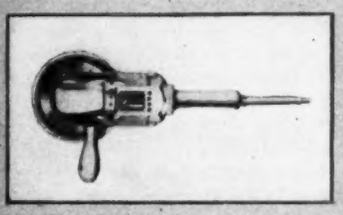

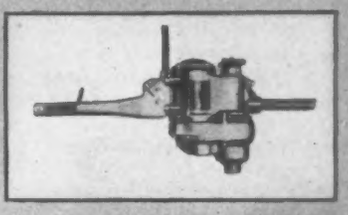

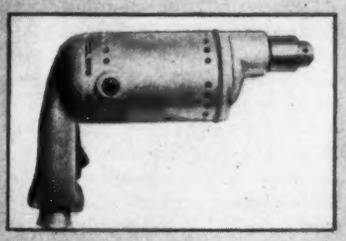

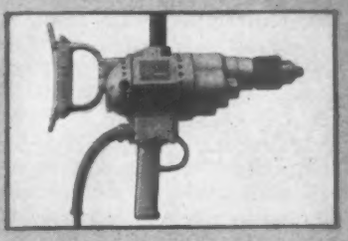

BLACK AND DECKER Mfg. Co. (Towson, Md.) produce a line of portable tools that is unrivaled in scope and in the diversity of duties it covers.

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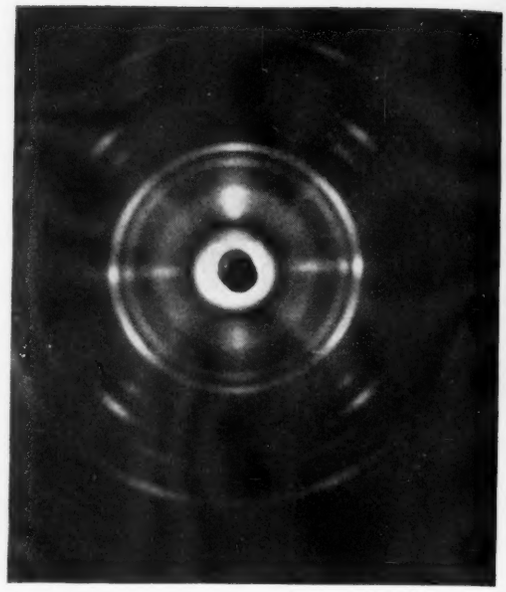


FIG. 3 (Left)—Typical X-ray diffraction pattern of a well-annealed sheet of ingot iron, showing random orientation. Fig. 4 (Right) — Diffraction pattern of highly cold-rolled sheet, illustrating a high degree of preferred orientation

ered upon which slip appears to be easier than upon others.

During further rolling, nature in an interesting manner exhibits a trait often found throughout all branches of science—that of offering the greatest possible resistance to any change which man tries to make. In this case it takes the form of aligning these numerous newly formed crystal fragments in the direction in which they offer the greatest resistance to further slip or deformation. In severe cold rolling this reaches the point where repeated passes through the rolls produce practically no further elongation of the sheet. If further rolling is desired the sheet must be annealed to destroy this complete lining up of crystals by causing them to recrystallize into larger grains with, as before, a random arrangement of their cubic atom lattices.

Two Types of Orientation

This alignment of small crystals in such a manner that their cubic atomic lattices are all turned nearly in the same direction in the sheet is called *preferred orientation*, and is practically opposite of the *random orientation* previously described. Fig. 4 is a typical X-ray diffraction pattern of ingot iron highly cold rolled to produce a high degree of preferred orientation. It will be noticed that the concentric circles which appear in Fig. 3 have shrunk to short arcs, indicating that all possible orientations of the atomic lattices no longer are present, but all the crystals are turned in one direction. This direction can be determined by an analysis of the positions of the arcs on the circles. The crystals are now small and the X-ray beam strikes so many that those portions of the rings which appear are now uniform instead of spotty.

A detailed consideration of how X-rays interact with crystals to yield these patterns from which their structure can be determined easily may become complex, but a readily grasped conception can be obtained by regarding the planes of atoms as mirrors reflecting the X-ray beam onto the photographic plate. But these atomic mirrors are peculiarly different from ordinary mirrors in that they do not reflect X-rays unless the rays strike at a definite angle.

Relation Is Developed

This angle is determined in accordance with a simple relation developed by Sir William Bragg and his son, involving the wave length of the X-rays and distance between the atomic planes of the family doing the reflecting. Thus since the atomic planes in different plane families are at different but definite distances apart, and since the X-ray beam employed is composed mainly of one wave length, then from the application of the Bragg relation the diffracted rays should be expected to proceed at angles characteristic of the plane families responsible for their reflection. If enough randomly oriented crystals lie in the path of the beam these diffracted rays will form complete cones whose intersections with the film will result in the formation of complete concentric circles as in Fig. 3. The appearance of the pattern shown in Fig. 4 indicates at once that the crystals composing the sheet do not lie in all possible positions as would be necessary to complete the circles, and the crystals are said to have preferred orientation.

It was in this manner that the atomic lattice of iron was determined. The angle at which the diffracted X-rays, which form each ring, struck the atomic planes can be calculated from the diameter of the rings and the distance from the specimen to the film. The wave lengths of the X-rays are well known and are constant for each target metal used in the X-ray tube. Using the Bragg relation the various distances between planes causing the various rings are determined and the problem turns into one of geometry. An atomic lattice must then be conceived which will be of such a type and size that the spacings between planes will account for all the rings found on the pattern.

But the determinations of atomic lattice structures of metals and investigations of the type and degree of preferred orientation are not the only applications to metallurgical research of this new tool which goes far beyond the minuteness of vision of the microscope, as evidenced by the fact that the atom planes are only approximately 0.00000001-inch apart.

Applications Are Numerous

X-ray diffraction has been used successfully to study sizes of minute crystals, even smaller than can be seen under the microscope; to detect the presence of internal strains and distortions within solids; and to identify new phases and compounds. It is being developed rapidly as a tool for the chemical analyst, and has grown indispensable to the crystallographer.

The research laboratories of the American Rolling Mill Co. have found these special abilities of the X-ray useful in following the effects of important metallurgical processes. The effects of variations in heat treatment in causing recrystallization to a desirable structure can be followed. The effects of different degrees of cold working of shapes and sheets can be established. In short, a whole new field of possibilities, for better control of quality and development of improved products has been opened.

Steel Founders Seek Better Castings Sales Practice

STEEL foundrymen are keenly interested in sales problems in relation to their industry as was demonstrated by an attendance of over 100 executives, sales managers and salesmen at a sales clinic in Columbus, O., March 20, under auspices of the Steel Founders' Society of America. The sales meeting, held the second day of a two-day district meeting, was conducted by E. St. Elmo Lewis, Philadelphia.

In introducing Mr. Lewis, Granville P. Rogers, managing director of the society, deprecated the attitude of many manufacturing organizations where a salesmen's views are discounted and his opinions discredited. The fact that the Steel Founders' society holds a different opinion of the value of a good sales organization is evidenced by the study made by the society covering faults in selling methods of steel castings and suggestions advanced both by buyers and foundry sales managers setting forth fundamental considerations in selling castings. Mr. Rogers believes that the three most essential elements in salesmanship are faith in product, concentration upon the needs of the buyer and thorough co-operation in the manufacturing organization.

Buyer's Attitude Important

Mr. Lewis stressed the value of the buyer's attitude of mind as a determining factor in successful sales. He believes that a fundamental consideration in any sales organization is remuneration. Everyone whose services affect profits must be interested in profit. Salesmen like an immediate appreciation of valuable service. A knowledge of the use is paramount in helping the buyer to buy.

One of the moot questions and one about which a great deal of discussion revolved was whether castings should be sold upon a price per piece or by weight or schedule. The difference of opinion seemed to lie between the manufacturer of large castings and the foundry which makes medium size or small work. The large castings manufacturer favors a schedule of prices varying within certain weight ranges and classified only roughly into subdivisions. The value of a price per piece on repetition work was acknowledged. One difficulty confronting the casting salesman is the inability to estimate costs accurately without thorough study and co-operation with the operating department. In general, foundries favor price quotations being made only upon authority of executives.

A warm discussion centered around 27 topics submitted for this conference. One of the elements which constantly was presented was the inability of castings salesmen to avoid a discussion based solely upon price. The question of misrepresentation by buyers of prices supposed to have been quoted by competing foundries resolved into an experience meeting. The majority opinion of those who discussed this question seemed to be that a closer co-operation between competing foundries would alleviate this element of misrepresentation.

The question of dumping at low and unprofitable prices in territories outside the natural sales radius of individual foundries also was discussed. Apparently this practice, encountered in practically every industry under prevailing business conditions, is particularly acute in the steel foundry business. The fallacy of mere tonnage as opposed to moderate operation at a profit was held to be true without argument. Therefore, those foundries which are selling outside their normal territory, below profit in the aggregate, lower the entire price structure and with the present limited market fail to achieve the benefit of full-time or capacity operation which they seek.

The topics of the meeting covered a wide range of vital problems. Altering original quotations, special considerations such as free machine work, free pattern work, special discounts, freight allowance and many other questions were presented for consideration.

Urges Careful Direction

Sales managers were advised to direct their sales organizations more carefully. An analysis of prospects according to the character and scope of their requirements was suggested as a means of conserving salesmen's time. One foundry reported a division of its prospect list into class A, B, C and D customers. Salesmen call upon class A and B customers at least once a month. Class C cus-

What About Steel Castings Selling?

TO DETERMINE what buyers of castings think of steel castings selling, the Steel Founders' Society of America recently directed a questionnaire to a number of purchasing agents, receiving replies from 100 companies. The inquiry developed a wealth of pertinent sales opinions. The questionnaire was similar in many respects to one on "Steel Selling" sent out by STEEL and reported on Page 255 of the Yearbook of Industry number of Jan, 1, 1931. Summaries of the Steel Founders' questionnaire are given below.

Rating of Steel Castings Salesmen

	Per cent
Steel castings salesmen are on a par with salesmen of other products....	83
They are above the average.....	15
They are below the average.....	2
	100

Summary of Faults in Salesmen

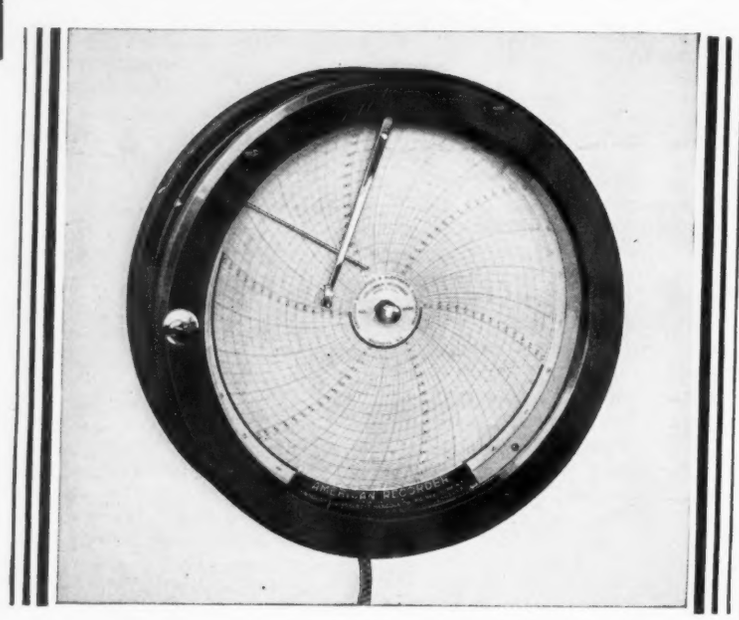
Lack of technical, foundry and engineering knowledge.....	38
Unethical sales practices, breaking of promises and disregard of truth....	25
Weak sales methods and policies.....	23
Lack of co-operation and service.....	14
	100

What Buyers Say

The four principal factors considered in purchasing steel castings, in order of their importance, were reported as:

1.	Quality of castings.....	72
2.	Service and reliability of foundry.....	12
3.	Location of foundry and delivery.....	10
4.	Price	6
		100

It's a Watchman's Clock . . . too!



Made in one size only (for standard 10" chart) in three models; mercury actuated, gas actuated and vapor-tension actuated; for temperatures within ranges from minus 40° F. to plus 1000° F. or corresponding Centigrade readings. Two types of cases; for wall mounting and for flush mounting.

THE patented Time Punch makes every American Recording Thermometer (and American Recording Gauge as well) a time clock. A simple little button mounted on the side of the case, punches a hole in the recorder chart to register the time of inspection.

Consequently these instruments offer you a double check: the usual chart record of fluctuations throughout the day; and a second record, on the same chart, showing the exact time at which every inspection of operating temperatures was made.

American Recording Thermometers are *guaranteed* to be accurate to within 1% of the entire scale range. This accuracy is a fundamental part of the design.

A Telechron electric clock is used if required, in place of the usual spring wound clock. The chart-holder is purposely made non-removable. The entire works are enclosed in a moisture-proof case.

These instruments, in short, are the most modern recorders available today.

• • •

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American Dial Thermometers	G-70	American Recording Gauges	E-70	Ashcroft Power Control Valves	M-70
American Glass Thermometers	F-70	American Draft Gauges	B-70	Hancock Drumhead Stop and Check Valves, Blow-Off Valves	WC-70
American Recording Thermometers	H-70	American Gauge Testers	D-70	Hancock Bronze Valves	WB-70
American Temperature Controllers	R-70	American Tachometers	J-70	Hancock Cast Steel Valves	WA-70
Ashcroft American Gauges	A-70	Consolidated American Safety and Relief Valves	Z-70	Hancock Forged Steel Valves	W-70
Ashcroft American Duragauges	T-70				

tomers are interviewed perhaps once a year and class D customers receive calls from the foundry salesmen only when time is available which cannot be expended upon the other classifications. Advertising matter specifically addressed to the class C and D prospects has been found effective. An increasing number of foundries report the use of business paper advertising and a few supplement this sales effort by direct mail printed pieces and circular wrappers.

The first day of the session was devoted largely to design and new uses problems. Prof. W. Trinks, department of mechanical engineering, Carnegie Institute of Technology, Pittsburgh, explained the fundamental considerations which govern the selection of materials and stressed those factors which will serve to increase the use and service of steel castings. The designing engineer faced with the problem of selection is governed by the fundamental rule of using the cheapest material that will serve successfully. Ability to meet peak demands and unexpected stress has recommended steel castings strongly to the designer of steel mill machinery.

Central Office Suggested

The suggestion was advanced that some unified, central organization, sponsored by manufacturers should have the responsibility for revising data on physical properties of materials for designing engineers and that such data should include figures on comparative costs, not available in books of specifications and standards.

At the combined session Thursday, reports of members covering orders, deliveries and operating rates, showed more than half the companies operating below 50 per cent, but 81 per cent report inquiries steady or increasing.

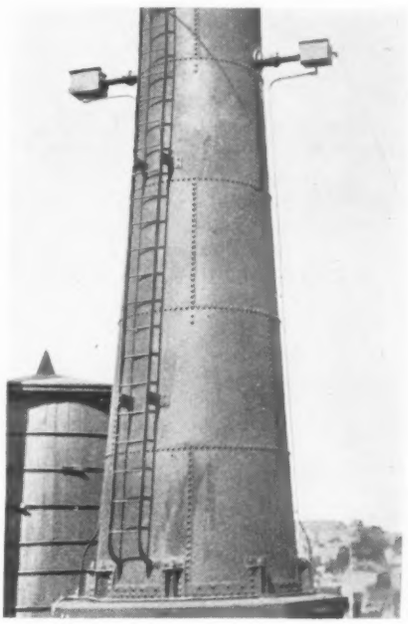
Mr. Rogers, in his report, told of the establishment of an engineering and metallurgical division under direction of J. J. Baum, whose duties at present center largely on developing new uses of steel castings. The new division will embrace representatives from engineering and metallurgical departments of member companies.

Mr. Rogers noted several new activities being promoted by the society. Data are being collected for a survey, covering the distribution of steel casting sales by industries and by geographical divisions. A survey has been completed on the comparative rates of electrode consumption in electric melting. A committee is working on a handbook on steel castings.

J. J. Baum, newly appointed engineer and metallurgist for the society, presented a paper on new uses of steel castings and reported the work which is being done to assemble data on strength and corrosion, wear and impact resisting properties.

Photoelectric Cell Records Smoke Density in Stack

AN INSTALLATION of a photoelectric smoke recorder which makes a graphic record of smoke density and rings a warning bell when a predetermined density is exceeded. The light source is on one side; the photoelectric cell and amplifier on the other. The density is continuously recorded on a clock-driven graph sheet. The photograph was supplied through the courtesy of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.



Materials, Methods Subjects at Welding Symposium

(*Concluded from Page* 46)

est in impact, other properties being equal, is the most desirable one to use.

"Welding Inspection," presented by R. Kraus, supervisor of welding inspection, Westinghouse Electric & Mfg. Co., dealt with the method of applying the welding process as well as the use of fillet welding gages and test specimens. The latter were devised to check the fusion of the filler with the parent metal and at the same time to permit a measurement of the quality of the weld in terms of tensile strength. Other tests described included the water-gravity, kerosene, high-pressure and air types.

Speakers at the evening dinner were K. G. Mackenzie and C. L. Warwick, the latter being secretary-treasurer of the American Society for Testing Materials. Several standing committees of the society also held sessions during the week in conjunction with the regional meeting. The Pittsburgh section of the American Welding society co-operated with the testing materials group in the program of the symposium.

Explains Operating Details of Electronic Tubes

One of the interesting features of the conference on electric control in industry, held at Case School of Applied Science, Cleveland, March 17 and 18, was an address, "Present and Future Use of Tubes in Electric Control," by E. L. Manning, physicist, General Electric Co., Schenectady, N. Y. By means of comparatively simple language and diagrams, and with the help of an ingenious demonstration board, Mr. Manning was able to convey to the audience a clear conception of the underlying theories of electronic tubes of various types.

Following this, he demonstrated by means of actual performance of tubes on the board, the various functions of light sensitivity, amplification, rectification of alternating current, conversion of direct to alternating current, etc., possessed by electronic tubes. The practical application of these functions was left to the imagination of the audience which was composed largely of engineers and machine designers.

British Iron and Steel Group in Annual Meeting

The annual dinner of the National Federation of Iron and Steel Manufacturers was held Feb. 19 at the Hotel Victoria, London, following the annual general meeting of the federation. Roland D. Kitson, director of Dorman, Long & Co., Ltd., and president of the National Federation of Iron and Steel Manufacturers, presided.

The principal address was given by the Right Hon. Neville Chamberlain, M. P., ex-minister of health in the past Conservative government. Mr. Chamberlain called upon the iron and steel industry to assist itself by a process of rationalization, and he gave a definite assurance that when a Conservative government comes into office, a tariff will be put on iron and steel.

A. J. Grant, joint managing director of John Brown & Co. Ltd., and Thos. Firth & Sons Ltd., responded to the toast and stated that previous successive governments had not given much help to the industry, which is overburdened principally by taxation and the high cost of labor.

Scanning the Technology of Steel

A Digest of Important Developments in Scientific Research, Engineering Progress and Operating Procedure Pertaining to the Production, Processing, Application and Performance of Steel

USES:

Rust Prevention

Means for combating the formation of rust on equipment during shutdown periods, discussed by Bernard Jeffs, in Black and White, April 1931, *p.* 17, 2 *pp.*, 1 *illust.*

Bright parts of machinery, except bearing surfaces, should be protected from corrosion with a high-grade rust preventative during lay-over periods or while in storage. The primary requisites are that the preventative be nonporous, tenacious and rust inhibitive. Lubricating oils, petrolatum and similar compounds lack these properties and are unsuited for use as rust preventatives. A half-and-half mixture of high-grade rust preventative and kerosene oil provides an excellent protective film for use on roll necks and rolls during lay-over periods. The rust preventative best suited for the protection of tools, parts, etc., is one of the nondrying grades. For scientific instruments, delicate machine parts, etc., a rust preventative of the drying variety is satisfactory.

STEEL, 3-26-31

PRODUCTION:

Electric Heat Treating

Discussion of the advantages of electricity in the heat treating of steel and the progress made in adapting electric power to this end, by G. W. Berhnard, a paper presented at the Western Metal congress in San Francisco, Feb. 16-20. 9 *pp., no illusts.*

The three major uses for electricity —light, heat and power—can be represented by the sides of an equilateral triangle. Use of electric light and power has increased rapidly in the past decade yet it is predicted that electric heat in a few years will surpass these two other sides.

A summing up of the advantages of electricity for heat treating shows the following points: It is ideal for applying automatic temperature control; it enables uniform heat distribution throughout the furnace; it gives laboratory precision to shop practice; it makes possible exact duplication of processing, day after day; it allows heat processing in the line of manufacture or assembly; it requires much less attention: it reduces labor turnover due to improved working conditions; it reduces equipment maintenance; it reduces the number of rejected products due to defective heating; and it guarantees uniformly high quality of product.

STEEL, 3-26-31

FABRICATION:

Electric Metal Cleaning

Advantages to be derived from the use of electric current in the cleaning bath, discussed by D. E. Williard, in Black and White, April 1931, *p.* 22, 3 *pp.*

Nonferrous metals are electrically cleaned with a current density of 20 to 30 amperes per square foot. Iron and steel can be electrically cleaned with a current density of 50 amperes per square foot. For steel the maximum available amperage is desirable and, therefore, rheostats are not necessary where iron and steel are the only metals to be cleaned in a tank. Twelve volts is necessary for batches of small parts in tanks or for barrel cleaning. The time for electric cleaning varies from 30 seconds to 3 minutes. The metal is cleaned either with direct current, or with reverse and direct current or with direct, reverse and direct current. The nature of the dirt to be removed and the metal being cleaned determine the flow of current and the time for each operation. Details of tank construction and the arrangement of anodes and electrical connections are presented.

STEEL, 3-26-31

MISCELLANEOUS:

Employment Code

Tentative draft of industrial employment code, in Bulletin of the Taylor society, 29 *West Thirty-ninth street, New York, p.* 19, 6 *pp.*

This code has been drafted in its present tentative form by a committee of the Taylor society, although it has not been adopted either in part or as a whole by the society or by the committee itself as a final document. No plans have been made for its adoption by the society, but it is hoped that after ample time for discussion—perhaps one year—some code may be developed which will meet with approval. Such a code as a formulation of experience, especially if kept up to date, would be useful to industry in the United States, and possibly in other countries.

The committee desires the widest possible discussion and suggestions from every source. The code considers: Criterion of what is satisfactory in human relations and conditions; objectives of an industrial enterprise; wages and earnings; hours of labor; security of employment; personnel organization; safety and health in workrooms; policies regarding age; employes' group relationships; and employment records.

STEEL, 3-26-31

Photoelectric Tubes

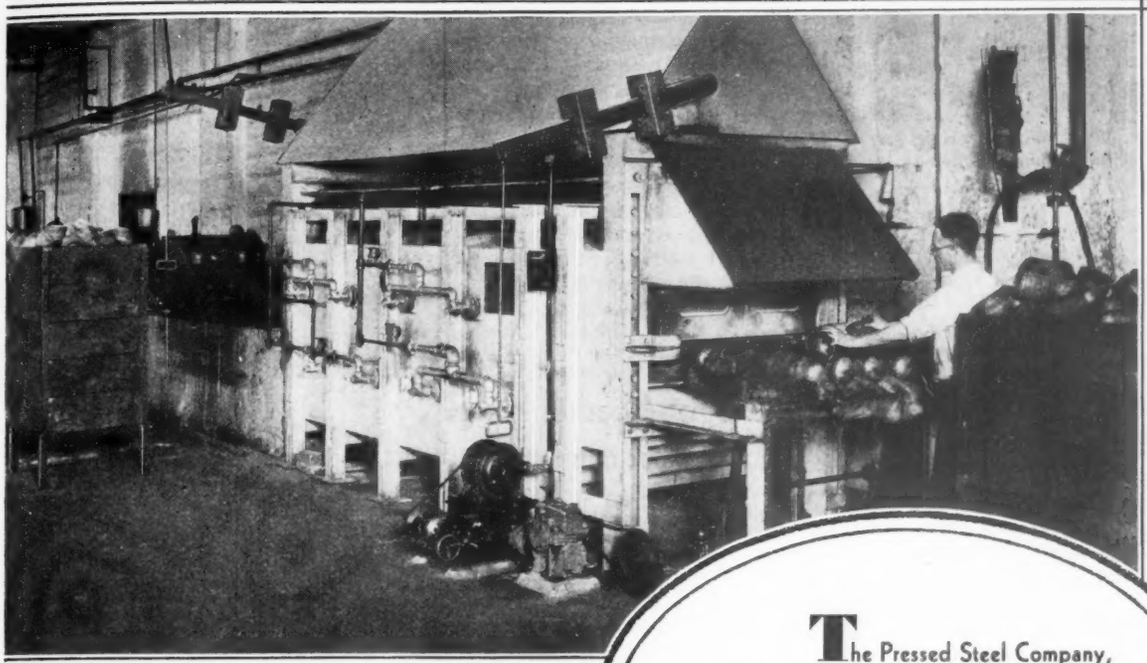
Concise and readable discussion of construction, operation and characteristics of photoelectric tubes, by Lewis R. Koller, in Journal of Western Society of Engineers, February 1931, *p.* 15, 11 *pp.*, 15 *illusts.*

Photoelectric tube applications are becoming more numerous every day, the best known being television and talking pictures. Industrial applications include smoke detectors, counters, bean sorters, light recorders, color analyzers, physical photometers and innumerable control devices. As engineers gain a knowledge of the properties and limitations of photoelectric tubes, they will doubtless find many more uses for them.

With all that has been said and written recently about the numerous spectacular and useful applications of tubes, little has been published to guide the engineer in making an intelligent selection of the tube or apparatus to accomplish a desired result. This article presents a simple discussion of tube characteristics that shows clearly what kind of tubes to select and their operating limits for different services.

STEEL, 3-26-31

SC CONTINUOUS ANNEALING FURNACE
CUTS PRODUCTION COSTS
«««« IMPROVES PRODUCT
FOR THE PRESSED STEEL COMPANY · WILKES-BARRE, PA.



Surface Combustion Continuous Annealing Furnace at The Pressed Steel Company, Wilkes-Barre, Pa.

The Pressed Steel Company, Wilkes-Barre, Pa., have effected unusual savings in production costs with a Surface Combustion continuous annealing furnace. Stampings, weighing up to three lbs. each, are annealed at the rate of 1000 lbs. an hour, at a temperature of 1500° F. . . . "We have eliminated all pickling, with such expenses as acids, tanks, coal to fire steam boiler, and four men," writes J. H. MacVeigh. "We are obtaining a very much better product which is uniform and which enables us to get out more production and less breakage."

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Surface Combustion

Surface Combustion Corporation, Toledo, Ohio – Sales & Engineering Service in Principal Cities

Machine Tools and Plant Equipment

«Without machine tools modern machinery could not be built.»
—Joseph W. Roe

Oil-Electric Locomotive Has Unusual Power

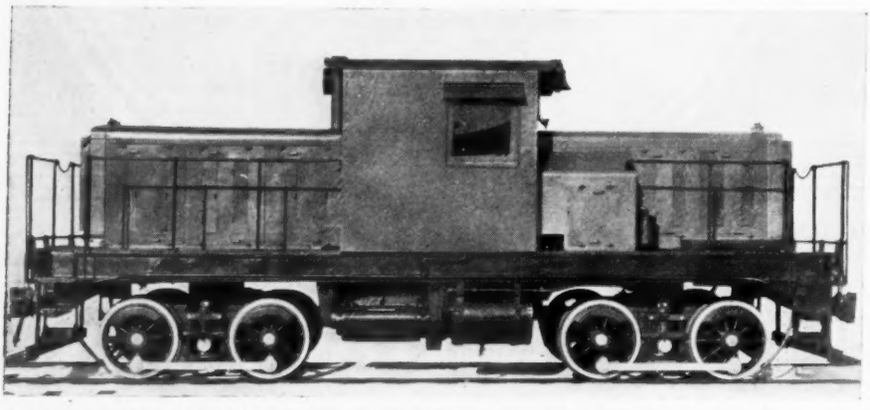
Heisler Locomotive Works, Erie, Pa., announces a new 60-ton oil-electric locomotive for which is claimed pulling power equal to that of the ordinary 100-ton superheated steam switching locomotive. This new oil-electric locomotive appears in the accompanying illustration.

Two 180-horsepower diesel engines built by the Buda Co., Harvey, Ill., furnish the power which drives two generators. These generators supply current for the driving motors from which the power is transmitted through a main driveshaft to the axles of the drive wheels. Generators and motors are built by Westinghouse Electric & Mfg. Co., East Pittsburgh.

Mounting of Power Units

The engines and generators are mounted above the frame level of the locomotive and are direct connected. The motors are suspended from the frame, directly below the generators and mid-way between the two four-wheel trucks. It is pointed out that this is unique in electric locomotive design, the usual practice being to place the motors directly over the axles.

Universal joints in the main driveshaft, working in conjunction with the swivel trucks, enable the locomotive to negotiate safely the sharpest curves. The design also is said to eliminate to a large extent energy losses through slipping or spinning wheels. Tests conducted by means of a dynamometer car show a draw bar pull of 47,800 pounds, which is the power required of a steam locomotive to pull about 80 loaded freight cars on a level track. The builder claims appreciable savings in fuel cost as compared to steam operation. Being smokeless in operation the locomotive is recommended for use in and around cities and industrial communities.



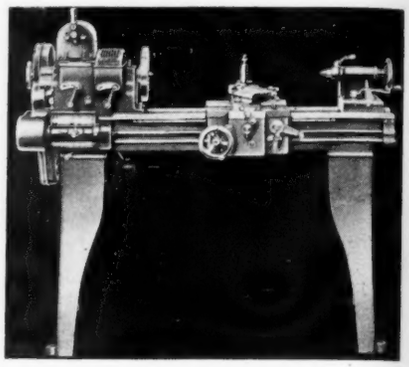
Diesel-electric locomotive built at Heisler Locomotive Works exerts draw bar pull of 47,800 pounds and assures smokeless and economical operation

◆

Medium Priced Lathes Have Up-to-Date Features

R. K. LeBlond Machine Tool Co., Cincinnati, offers at low prices under a deferred payment plan, a new line of engine lathes designed particularly for use in general service shops, schools, garages, experimental laboratories, and in shops where light manufacturing is done. The accompanying illustration shows one of these new lathes.

The bed is of a particularly close grained iron containing steel and nickel. It is of box section made unusually rigid by numerous cross girths. The headstock is a box casting reinforced under the main spindle bearings, with the bearings for the main drive shaft and intermediate shaft cast integral with the head. The headstock with its cover provides an oil-tight case for the driving gears, which run in an oil bath, driving shaft bearings being lubricated by splash from the gears. Sliding gears, which require no jaw clutches, give eight changes of speed to the spindle. It is impossible to engage two driving ratios of conflicting nature at the same time.



Advanced design and low price mark this new Le Blond lathe

The tailstock can be set over for taper turning and is designed to allow the compound rest to be used parallel to it. The compound rest has its movement in a dovetail on the carriage bridge. The cross feed screw controls movement of the compound rest in either direction by hand or by power for facing and cutting off operations.

Micrometer Dials Provided

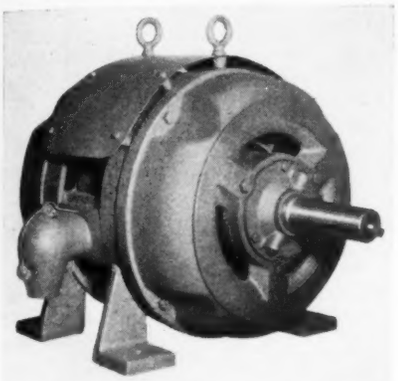
The collar of the crossfeed screw is graduated to 0.001-inch while the compound rest swivel slide is graduated in degrees and may be set at right angles to the cross slide or at any angle for boring short, steep tapers. The top slide has screw adjustment with graduated collar reading to 0.001-inch.

Practically the same quick change box and apron is used as in the case of heavy-duty engine lathes built by this company, there being separate lead screw and feed rod. Frictions in the apron have been replaced by a positive pinion-type clutch whereby the feed is either in or out with no chance of its engaging of its own accord. Cross feed and longitudinal feed cannot be engaged at the same time, and half nuts are interlocked to prevent the feed and thread cutting mechanism being engaged simultaneously. The feed can be reversed by means of tumbler gears, the reverse

plate also being used for reversing the lead screw.

The quick change box is a complete unit bolted to the front of the lathe bed, two levers being used to get 24 changes of feed and threading lead. By means of a slip gear on a quadrant, 48 changes are possible. A direct reading index plate shows where to place the levers to secure desired feed, or lead for threading.

◆



Drip cover effectively protects windings of Reliance electric motors

Sheet Steel Motor Covers Give Drip Protection

Reliance Electric & Engineering Co., 1042 Ivanhoe road, Cleveland, has developed drip covers for use on both alternating and direct-current motors of its manufacture. The accompanying illustration shows a motor with one of these covers installed.

The covers are intended particularly for application to motors in use where dripping water, acid or other injurious liquids is unavoidable. In spite of high-grade insulation such drippings will harm any motor and use of these covers is said to lower maintenance costs appreciably, as well as to keep the motors clean.

Heavy-gage sheet steel is used in making the covers which are bolted to the motor frames in a manner which allows free air circulation between motor and cover.

◆

Massive Hydraulic Press Has 1500-Ton Capacity

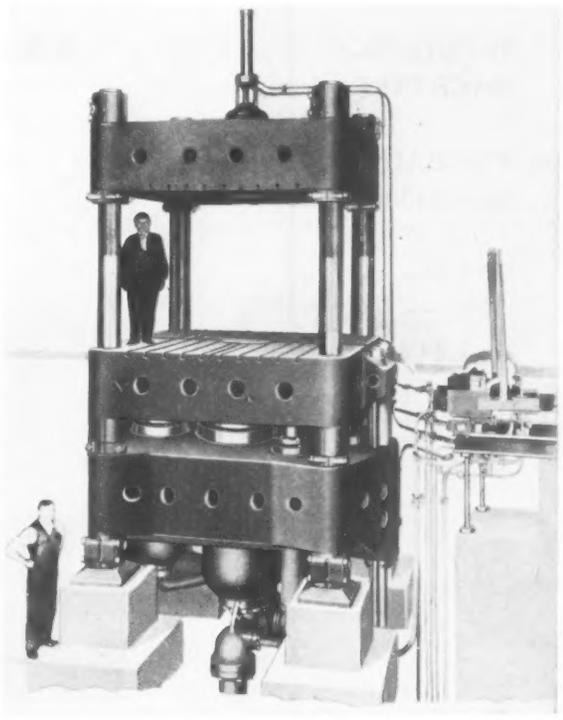
Farrel-Birmingham Co., Ansonia, Conn., has built a 1500-ton hydraulic press which is designed especially for hot flanging and forming heavy metal parts such as tank ends used in connection with circuit breakers, oil switches, etc. The accompanying illustration shows not only the portion of the machine above the working floor line, but also the foundation arrangement, the hydraulic mechanism and the control apparatus below the floor level.

A unique feature is that in addition to the main ram which is 34 inches in diameter and which provides pressure of 1000 tons, two auxiliary rams 18 inches in diameter, are provided, each of which supplies an additional 250 tons pressure. This enables the press to be operated as a triple capacity machine yielding 500, 1000 or 1500 tons pressure, as required. Also, the 500-ton capacity can be used for clamping, while the 1000-ton capacity is used for drawing. In the latter case the 34-inch ram works through the guides on the moving platen.

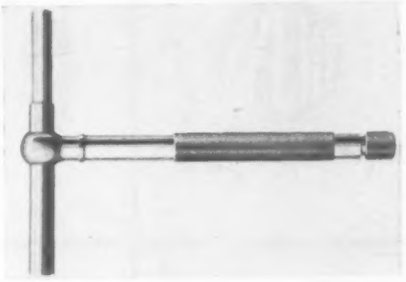
Provisions for Prefilling

The press is equipped with auxiliary lifting rams for prefilling the main cylinders with water from a surge tank. The lifting cylinders operate the moving platen and the main 34-inch ram together or separately. For prefilling, two hydraulic operating valves are used. All return strokes are accomplished hydraulically to assure speed of operation. There also is a 250-ton knockout cylinder in the top platen. Standard types of control and operating valves are used, their spindles and seats being of nitralloy to insure long life.

As is indicated by the illustration, the press is of imposing size. It is 97 x 85 inches between tie-rods, has maximum opening of 72 inches and 48-inch stroke. Overall height from floor line to top is 13 feet 8½ inches, and the distance from floor line to foundation is 20 feet 11½ inches, making a total height of 34 feet 8 inches. Floor space occupied is 13 feet 3 inches x 9 feet 6 inches. The bottom platen weighs 32 tons, the main ram 9 tons and the columns 3 tons each.



Hydraulic press of triple capacity type, giving maximum pressure of 1500 tons, was designed by Farrel-Birmingham Co. for hot flanging and forming heavy steel tank ends. Massive construction is denoted by weight of main ram, which is nine tons



Lufkin telescoping gages will measure from ½ to 6-inch diameters

◆

Telescoping Gages Have Central Handles

Lufkin Rule Co., Saginaw, Mich., has placed on the market a line of telescoping gages which have centrally located handles. The accompanying illustration shows one of the gages. Each tool consists of a handle

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FOR
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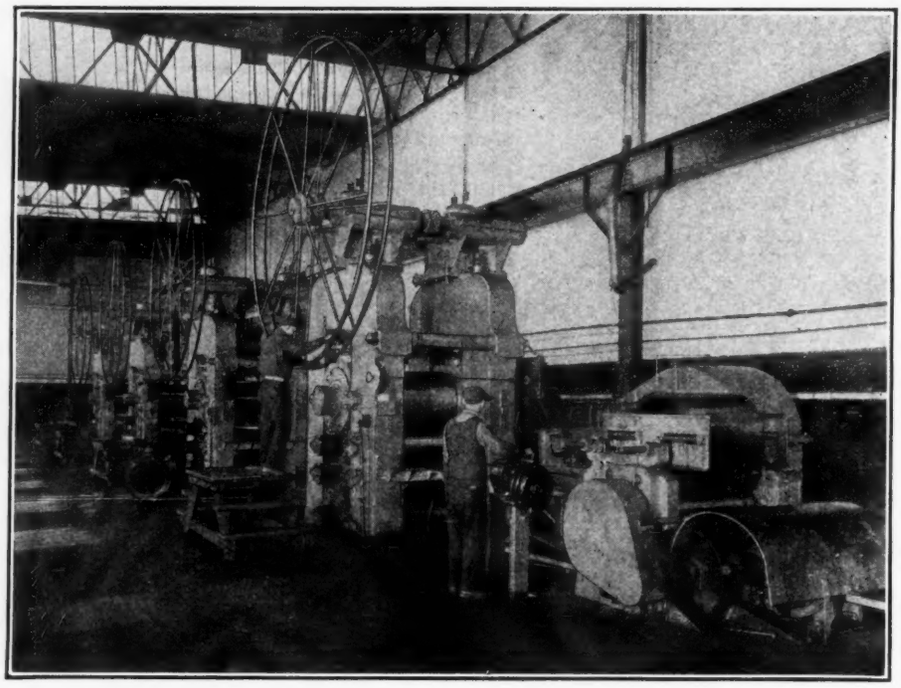
ETC.

ETC.



BLISS FOUR-HIGH MILLS
ROLLER-BEARING EQUIPPED

These mills are built in all sizes and roller-bearing equipped throughout.

Full details on request.

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No. 574

and two plungers, one of which telescopes into the other with locking effected by a slight turn of a knurled screw at the end of the handle. The feature of easy control locking of the handle permits the attainment of the perfect balance or "feel" which is essential to accurate gaging.

These gages are made in five sizes, to enter holes from ½ to 6 inches in diameter, the hardened ends of the plungers being ground to a radius which assures clearance in the smallest hole which the gage will enter. They are furnished separately, or in complete sets inclosed in red leatherette cases.

◆

Polishing Lathe Features Independent Spindles

Charles F. L'Hommedieu & Sons Co., 4521 Ogden avenue, Chicago, has developed a motor driven polishing and buffing lathe of the independent spindle type. This machine is designed for high production and incorporates a number of safety features. It is shown in the accompanying illustration.

The independent spindles of this machine operate in dustproof antifriction bearings while the drives are by four-sheave V-belts from motors mounted in the base. Each motor is independent of the other and the sheaves can be removed readily and others substituted when it is necessary to make speed changes. The motors are ball bearing and fan cooled. Push button controls are provided for starting the motors, while auxiliary switches also are provided so that each motor is stopped as soon as the spindle brake is applied. Spindle locks hold the spindles firmly while the operator is changing wheels.

The lathe weighs 1600 pounds, while the overall length of the spindle is 76 inches. Distance from the floor to the spindle center is 38 inches and the floor space occupied by the machine is 26 x 49 inches.

◆

Medium-Duty Spot Welder Is of Top-Drive Type

Lenney Machine & Mfg. Co., Warren, O., has added to its line of spot welders a machine for medium heavy service, which can be furnished in capacities of 20, 25 and 33 kilovolt-amperes. One of these machines is illustrated at the right.

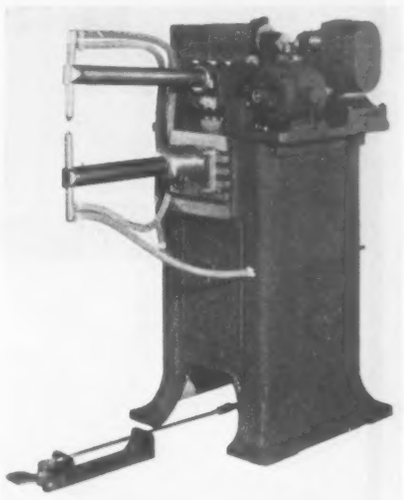
This welder is of the top-drive type, with most of the mechanism mounted on the base. It occupies no more floor space than a foot-power machine of corresponding capacity. Power is supplied by a ½-horsepower motor and is controlled by a foot treadle which operates a positive clutch. Five changes of speed, ranging from 45 to 140 revolutions per minute, are provided, and current regulation is by means of an autocoil with eight steps. The automatic switch is mounted on top of the frame, being driven direct from the main shaft. It has a wide range of contact time.

◆

Depth Gage Is Useful for Checking Counterbores

Brown & Sharpe Mfg. Co., Providence, R. I., announces a new gage for accurately checking depths of holes and counterbores, and distances between shoulders and flanges. It also can be used for numerous other measurements calling for a small depth gage, and it has the peculiar advantage of usefulness against or between small shoulders or in shallow recesses.

The tool consists of a hardened and ground body in which four polished rods of varying lengths can be held



New spot welder is added to Lenney Machine & Mfg. Co. line

adjustably by means of a thumb screw. A V-groove is cut into the body to facilitate measuring against a curved surface.

Depths ranging from 0 to 2 inches by thousandths of inches are obtained by adjusting the overall length of body and rod by means of a micrometer. From this measurement is subtracted the length of the body, which is exactly 1 inch. If desired, the tool also can be used to measure distances from 1 to 3 inches between shoulders, etc. When used for this purpose, the micrometer reading of the overall length of the tool is the correct dimension.

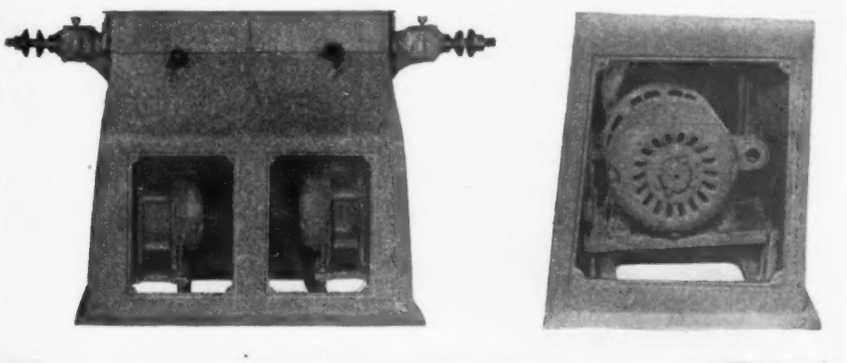
◆

Gage Checks Roundness of Cylindrical Parts

Automotive Maintenance Machinery Co., 816 West Washington boulevard, Chicago, has brought out a gage for rapidly and accurately checking the roundness of cylindrical parts ranging in diameter from ¾ to 6 inches. The accompanying illustration shows the device in use checking the roundness of an automobile piston.

The tool consists of an accurate V-block at the back of which is mounted a round column carrying an adjustable clamp. This clamp carries a dial gage which reads to 0.0005-inch. Work to be checked is rotated in the V, with the feeler of the gage in contact with its periphery. The swing of the indicator hand shows the degree of deviation from true roundness and locates its relative position.

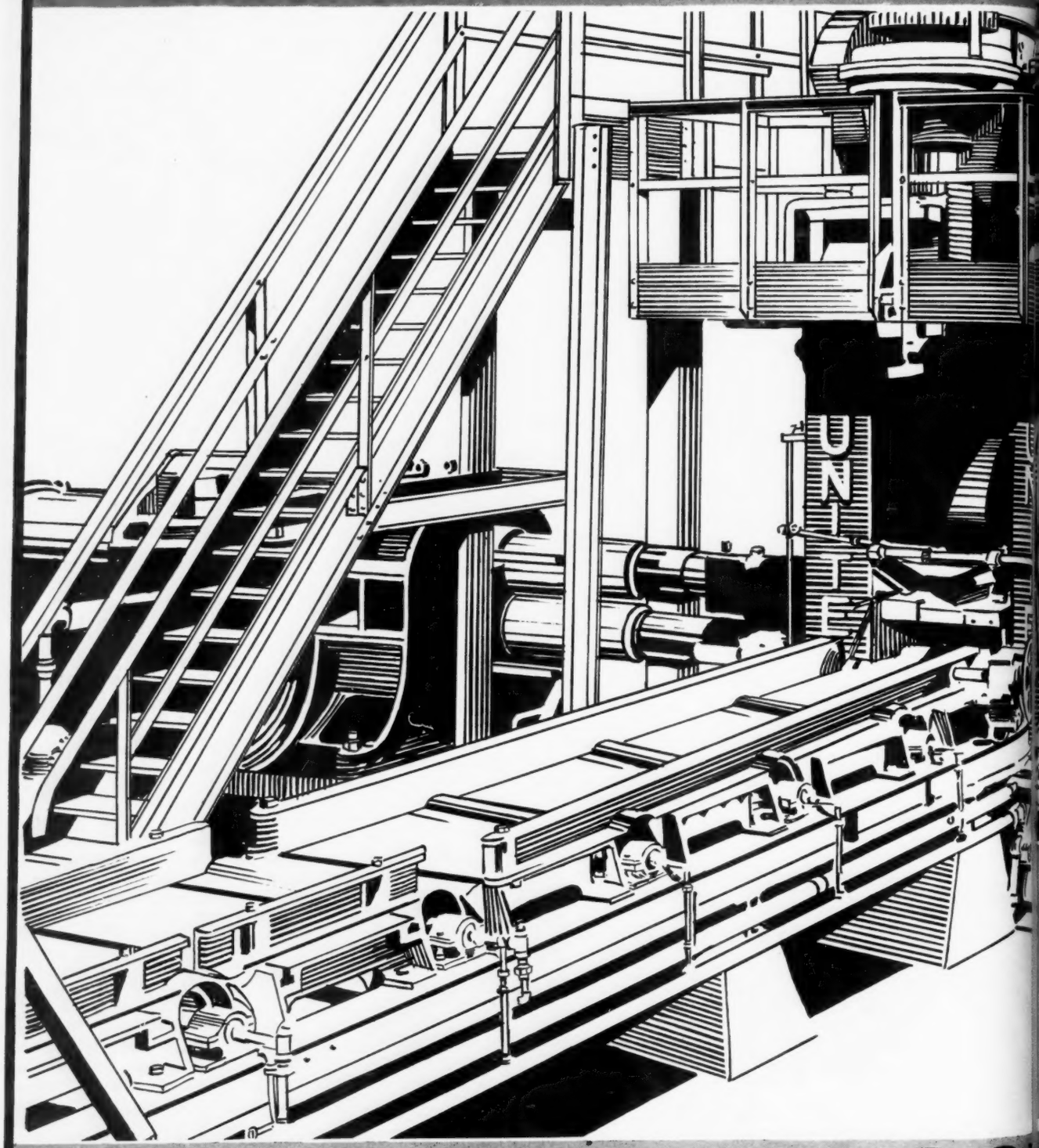
The tool is applicable both to direct measurement and comparative



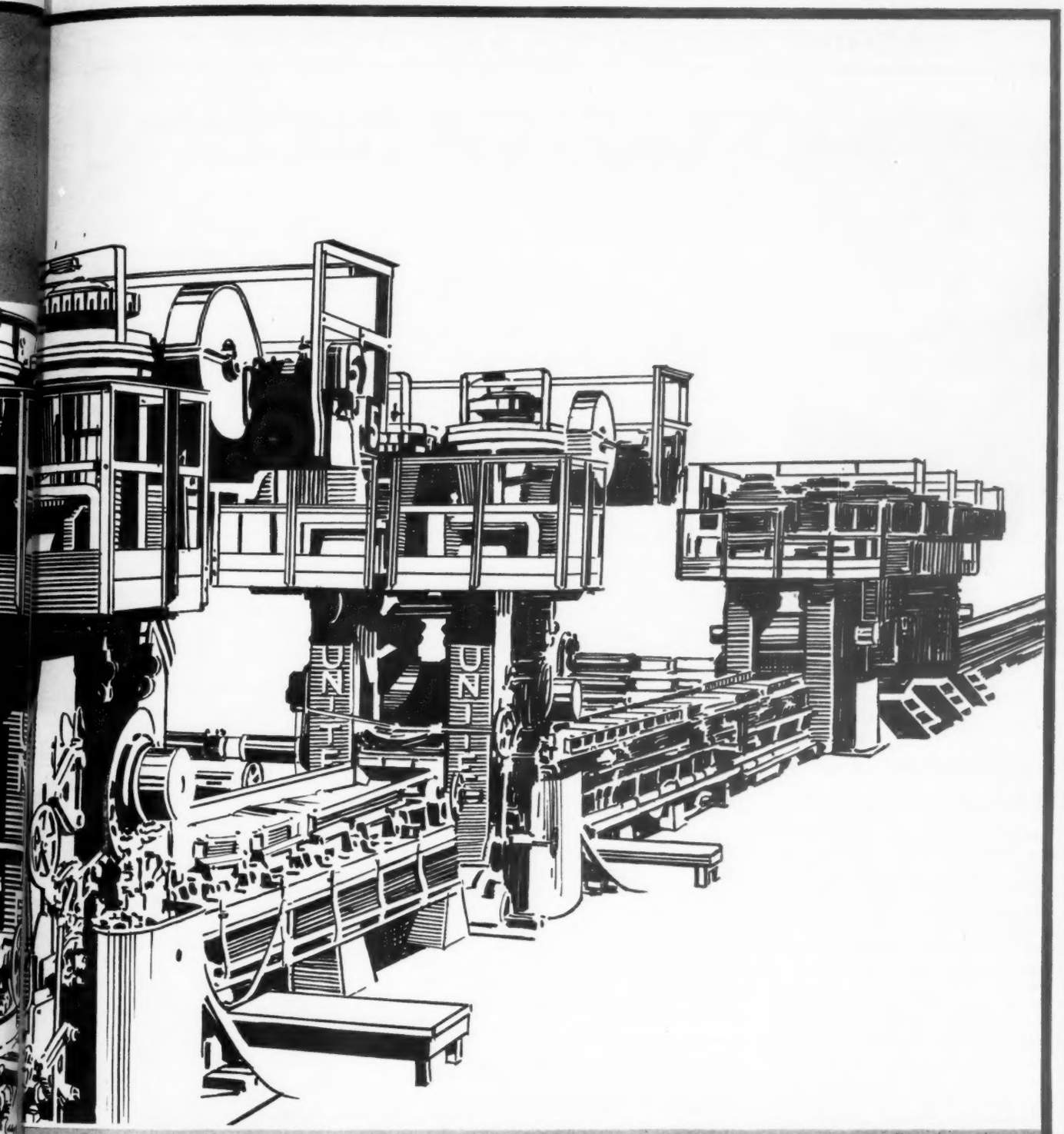
Motor-driven polishing and buffing lathe built by Charles F. L'Hommedieu & Sons Co., has independent spindles and is designed for high production

4-HIGH CONTINUOUS
Hot and Cold Strip Mills
Originated and Developed by
UNITED

15 UNITED installations now in operation or in process of building



THE WORLD'S LARGEST MAKER O



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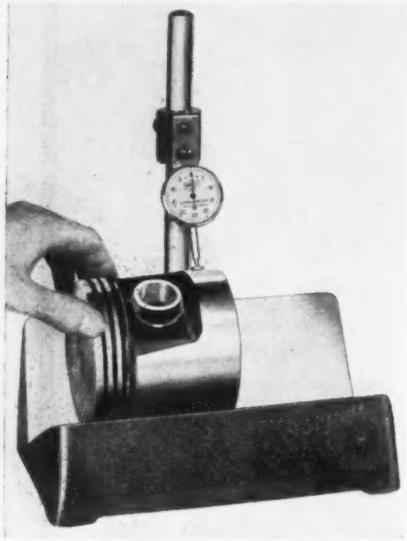
PITTSBURGH, PENNSYLVANIA

ROLLS AND ROLLING MILL EQUIPMENT



Roundness gage developed by Automotive Maintenance Machinery Co.

checking. Gage setting rings can be furnished as extra equipment, these being of any specified diameters, oversizes or undersizes, within the range of the instrument.

◆

Standard Magnetic Blocks Aid Grinding Setup

Congress Tool & Die Works, 430 South Green street, Chicago, announces a line of standardized interchangeable magnetic blocks for use in supporting work in connection with magnetic tables and chucks on grinding machines. These standard magnetic blocks are built up of a number of laminations of special alloy steel, separated by nonmagnetic layers of uniform thickness. The assemblies are held together by means of strong nonmagnetic rivets. The blocks measure 3¾ x 2½ x 1¼ inches, and all faces are ground to close limits to make the surfaces parallel and adjacent faces at exactly 90 degrees to each other. This cuts to a minimum the number of measurements necessary in making a setup.

The design reduces hysteresis or iron loss and leakage of flux between laminations to a minimum and the special silicon alloy steel insures exceptionally strong magnetic circuit, with unusual freedom from residual magnetism. These blocks can be used close to the edge of standard commercial chucks or tables, where ordinarily neither blocks nor work would be held satisfactorily on account of low density of magnetic flux. Moreover, their grip is not affected materially by voltage fluctuations resulting from starting large motors, welders, etc.

The maker claims that setups which ordinarily require from 30 minutes to several hours can frequently be made in 2 to 5 minutes by means of these blocks, and that sheet steel only 0.005-inch thick can be held by one of these blocks so that 0.0001 or 0.0002-inch can be ground off without difficulty. They are recommended for use in grinding punches in punch holders, and for setups where two or three blocks must be mounted one on top of the other or side by side.

◆

Hydraulic Pumps Handle Lubricating Liquids

Tuthill Pump Co., 131 West Sixty-third street, Chicago, has brought out a new line of ball bearing equipped oil pumps. These pumps primarily are intended for hydraulic applications but they also are suitable for handling all kinds of lubricating liquids.

The new pumps are of the rotary, internal gear, positive delivery type. In addition to ball bearings which take both thrust and radial loads, construction features include improved stuffing boxes and optional end or foot mounting. Direct motor drive gives speeds up to 1200 revolutions per minute and pressures up to 200 pounds per square inch. Efficiency as high as 70 per cent is claimed on good grades of lubricating oil. Upright ports maintain prime and the pump can be driven in either direction.

The builder points out that the end type of mounting makes it possible for designers to incorporate these pumps neatly into their machines in minimum space.

◆

Shock Absorbing Coupling Employs Rubber Balls

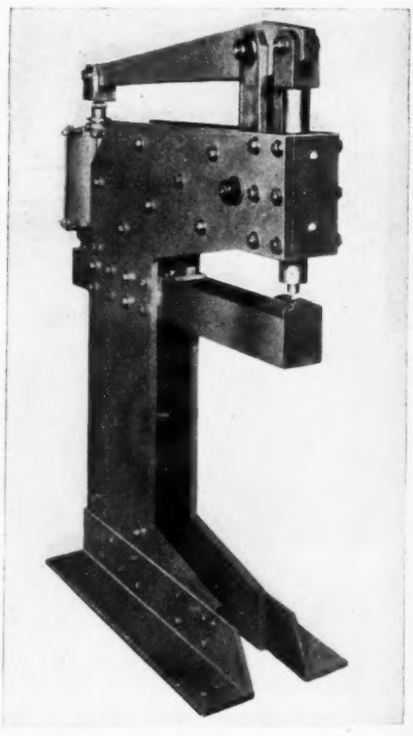
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., announces a novel type of flexible coupling designed to provide maximum possible torsional resistance and shock absorbing ability. The flange half of this coupling has six cylyindrical pockets, all parallel to the shaft, with circular grooves in the spaces between the pockets. The other half, called the spider, has six projecting lugs between which are placed shock absorbing rubber balls. When assembled the balls occupy the pockets in the flange, and as the transmitted torque varies, the lugs on the spider squeeze the balls, thereby taking up the shock, regardless of direction of rotation.

All-Steel Piercing Press Is Air Operated

Hannifin Mfg. Co., 621 South Kolmar avenue, Chicago, has designed a new type of air-operated piercing press which, with the exception of the air cylinder, is constructed entirely of standard steel plates and shapes bolted together, giving unusual strength with minimum weight. The machine shown in the accompanying illustration was built for punching 1 5/16-inch diameter holes in cylindrical copper boiler shells.

The mechanism is extremely simple. The air cylinder, located at the rear of the frame, is pivoted at its lower end to an extension of the rigid arm which supports the die. The end of the piston rod is pivoted to the end of the long arm of a lever, the short arm of which is pivoted to the cylindrical punch slide. The fulcrum between the long and short arms is at one end of a fork, the other end of which is pivoted in the head so that the fulcrum can oscillate slightly as the punch slide moves on a straight line in its bearing block in the front of the head.

The press is operated by compressed air from the regular shop lines, being controlled by suitable foot or hand valves placed to suit the work being done. This assures maximum operating efficiency.



Steel fabricated pneumatic piercing press designed by Hannifin Mfg. Co.

Large Users Buy; Small Ones Defer

Pennsylvania's 120,000 Tons Near Award —Contracting for Second Quarter Light and Prices Untested —Autobody Sheet Prices Highly Irregular —Operations Down

STEEL presents a top-heavy market this week. Large consumers apparently are satisfied with general conditions and prices and are proceeding with their projects, but rarely have average buyers been so indifferent to their future requirements.

Last week's record award of 125,000 tons of structural steel for the Metropolitan Square-Radio City development in New York to subsidiaries of the United States Steel Corp. is to be followed closely by the distribution of 120,000 tons by the Pennsylvania railroad.

However, increased prices announced for the second quarter on steel bars, plates and shapes —comprising the bulk of all steel tonnage— have neither prompted users to specify out their lower-priced contracts or protect themselves prior to the second $1 advance effective April 1.

The situation in these products is somewhat complicated by varying policies regarding carryovers, but most producers will accept until March 31 specifications on current contracts to be shipped at mills' convenience.

In other steel products, principally sheets, a mixed price situation also obtains. A long-awaited conflict between continuous and jobbing mills on high finishes of sheets has come out in the open. The former 3.30c, Pitstburgh, price on these sheets has retreated to 3.20c— perhaps even lower—and some mills declare their determination to retain their customers regardless of cost.

This break in the high finishes threatens to permeate through the entire sheet price structure, and in isolated cases concessions are reported on the common finishes. Some shading of strip steel, chiefly to the automotive trade, is reported. On wire products the new $2 advanced prices have not yet been put to the test.

Fourteen producers have bid on the approximately 120,000 tons of steel for the Pennsylvania railroad, with the following eastern mills apparently being low on certain sections: McClintic-Marshall division of Bethlehem Steel Corp., American Birdge Co., Lehigh Structural Steel Co., Phoenix Bridge Co., Shoemaker Bridge Co. and Belmont Iron Works. Opinion is that the bulk of the tonnage will be booked by Bethlehem. Under the Clayton act, an award by April 3 is mandatory.

Without the benefit of a 125,000-ton award, as was the case last week, structural orders this week approximate 32,000 tons, compared with the unusual total of 146,484 tons last week and 26,426 tons in the comparable week of 1930. Thus far in 1931 structural orders total 502,000 tons; a year ago they were only 425,148 tons.

Concrete bar awards this week approximate 19,000 tons, exceeding by almost 5000 tons any previous 1931 week. This week included, 1931 bar awards total 97,000 tons; 1930 in the comparable period was but 84,293 tons.

Strip, wire, bars, plates, pipe—in fact practically all steel products save structurals—appear on dead center. Automotive requirements are broadening, but at a slow rate. Inertia is most marked in pipe, there being no new bookings except 6000 tons for a Texas line booked by the A. O. Smith Corp., which also has formally announced the closing of the remainder of the Southern Fuel Co. line in California. The North Central Gas Co., New York, has withdrawn its inquiry for 30,000 tons of pipe.

Steelmaking operations, after an unbroken rise from the 33 per cent low of the holiday period to the 57 per cent rate of last week, have receded one point this week to 56 per cent. Pittsburgh operations are up 2½ points this week to 52½ per cent and Chicago is unchanged at 60 per cent and Youngstown at 51, but eastern Pennsylvania mills are off one point to 51 per cent, Cleveland off two to 68, Buffalo off 5 to 46. Birmingham is steady at 65 per cent.

Those Lake Superior iron ore producers who have quoted on the Ford Motor Co.'s inquiry for 290,000 tons have reaffirmed last year's prices, which was expected.

STEEL's market composite is unchanged this week at $31.71, following its 10-point rise two weeks ago. Next week the composite will enter the area where the new prices may affect it.

Composite Market Averages

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe.

This week (March 25, 1931)	**$31.71**
Last week (March 18, 1931)	**31.71**
One month ago (February, 1931)	**31.65**
Three months ago (December, 1930)	**31.74**
One year ago (March, 1930)	**34.95**
Ten years ago (March, 1921)	**45.37**

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	March 25, 1931	Feb. 1931	Dec. 1930	Mar. 1930
PIG IRON				
Bessemer, del. Pittsburgh	$18.26	18.51	18.76	20.76
Basic, valley	17.00	16.75	17.00	18.50
Basic, eastern del. eastern Pa.	17.50	17.25	17.50	18.80
No. 2 foundry, del. Pittsburgh	18.26	18.01	18.26	19.76
No. 2 foundry, Chicago	17.50	17.50	17.50	19.50
*Southern No. 2, Birmingham	13.00	13.00	14.00	14.50
**No. 2X, Virginia furnace	18.25	18.25	18.25	18.25
**No. 2X, Eastern del., Phila.	18.26	18.26	18.26	20.76
Malleable, valley	17.00	17.25	17.50	19.00
Malleable, Chicago	17.50	17.50	17.50	19.50
Lake Superior, charcoal, del. Chi.	27.04	27.04	27.04	25.04
Gray forge, del. Pittsburgh	17.63	17.38	17.63	19.13
Ferromanganese, del. Pittsburgh	89.79	89.79	93.29	103.79

*1.75 to 2.25 silicon. For local delivery. Northern shipments based on $11, Birmingham. **2.25 to 2.75 silicon.

COKE				
Connellsville furnace, ovens	2.50	2.50	2.50	2.60
Connellsville foundry, ovens	3.25	3.25	3.50	3.50
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngs.	30.00	30.00	30.50	33.00
Sheet bars, open-hearth, Pitts.	30.00	30.00	30.50	33.00
Billets, open-hearth, Pittsburgh	30.00	30.00	30.50	33.00
Wire rods, Pittsburgh	37.00	35.00	35.50	38.00

	March 25, 1931	Feb. 1931	Dec. 1930	Mar. 1930
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.65	1.65	1.60	1.85
Steel bars, Chicago	1.70	1.70	1.70	1.90
Steel bars, Philadelphia	1.94	1.94	1.89	2.27
Iron bars, Chicago	1.70	1.75	1.70	1.95
Shapes, Pittsburgh	1.60	1.60	1.60	1.80
Shapes, Philadelphia	1.81	1.81	1.76	2.01
Shapes, Chicago	1.70	1.70	1.70	1.90
Tank plates, Pittsburgh	1.65	1.65	1.60	1.85
Tank plates, Philadelphia	1.80½	1.80½	1.80½	2.10
Tank plates, Chicago	1.70	1.70	1.70	1.90
Sheets, blue anl., No. 13, Pitts.	2.05	2.05	2.05	2.25
Sheets, black, No. 24, Pitts.	2.35	2.35	2.35	2.65
Sheets, gal., No. 24, Pittsburgh	2.90	2.90	2.90	3.30
Sheets, black, No. 24, Chicago	2.50	2.50	2.50	2.80
Sheets, blue anl., No. 13, Chicago	2.20	2.20	2.25	2.40
Sheets, galvanized, No. 24, Chi.	3.05	3.05	3.15	3.45
Plain wire, Pittsburgh	2.20	2.20	2.25	2.40
Wire nails, Pittsburgh	1.90	1.90	1.90	2.30
Tin plate, per base box, Pitts.	5.00	5.00	5.00	5.25
SCRAP				
Heavy melting steel, Pitts.	13.00	12.75	12.75	16.60
Heavy melting steel, eastern Pa.	10.50	10.50	11.00	16.25
Heavy melting steel, Chicago	9.75	9.85	10.00	13.20
No. 1 wrought, eastern Pa.	11.00	12.50	13.50	16.25
No. 1 wrought, Chicago	9.00	9.25	10.00	13.50
Rails for rolling, Chicago	12.00	12.10	13.00	15.00

Sheets

More Mills Reduce Autobody Sheets $2 a Ton for Second Quarter—Market Quiet

SHEET PRICES, PAGE 67

Pittsburgh—Sheet sales are disappointing, holding at the slow rate of the preceding several weeks and showing only a slight increase since a month ago. Prices have lost some strength during the past several weeks but with the exception of autobody this has not resulted in a definite reduction. Common black sheets are steady at 2.35c, Pittsburgh, but on material involving extras shading occasionally is noted. Galvanized usually are 2.90c with some concessions made to jobbers. Blue annealed generally are unchanged at 2.05c for No. 13 gage and 1.90c for Nos. 9 and 10 gage but some lower prices are noted in competition with the continuous mill product. Autobody sheets are 3.20c against 3.30c since the first of the year.

Philadelphia—Galvanized sheets are subject to shading at 2.85c to 2.90c, Pittsburgh. Black are fairly steady at 2.35c. Blue annealed are 1.90c and 2.05c.

New York—Sheet specifications are showing little gain, with prices irregular particularly on galvanized sheets. While 2.90c, Pittsburgh, is now being applied to most orders, some jobbers are able to do $1 a ton less. Black are holding generally at 2.35c, Pittsburgh; blue annealed at 1.90c and 2.05c, except where it is necessary to make concessions to meet strip competition.

Buffalo—Sheet sellers here are pleased with the Canadian order-in-council permitting shipment of American sheets into Canada for galvanizing. This permission, effective until Aug. 31, will be a great stimulant to sheet sales in the Dominion, it is believed here.

Youngstown, O.—The long-awaited price conflict between wide strip and sheets appears to have been precipitated by the request of a half dozen important automotive concerns that second quarter prices on various materials be submitted around March 12-14. Sufficient of the prices submitted are becoming known and have had the effect of throwing the autobody sheet trade into confusion. Out of it has come a cut of $2 a ton in autobody sheets to a flat 3.20c, Pittsburgh, with a suspicion that possibly a lower quotation has been named on sheets. Autobody sheet mills appear determined to hold their trade. This appears to have set the stage for an interesting battle between such mills and the makers of high-finished strip steel. Makers of common grades of sheets hope to keep out of the struggle, at least for the remainder of this year. Other prices are unchanged.

Cleveland—Sheet sales are depressed. Price weakness is increasingly manifest, particularly on autobody and black grades where sales $2 below the market of 3.30c, Pittsburgh on the former and 2.35c, Pittsburgh, on the latter grade, have been made. The Fisher Body Co. is ready for another release which suppliers expect to be the largest of the year to date for one cold pass, pickled stock. A local manufacturer of metal partitions is operating on a good schedule. Stocks of all grades are low at consuming plants. Nos. 9 and 10 gage blue annealed continue 1.90c, Pittsburgh; metal furniture is unchanged at 3.60c; galvanized at 2.90c has been under pressure and has yielded beneath this figure. Autobody sheets are 3.20c to 3.30c, reflecting an easing of $2 a ton. Black sheets are being shaded to 2.25c by a large independent.

Chicago—For the second successive week sheet mills are maintaining 70 per cent operations. Mills claim to be obtaining 3.00c, mills, for No. 24 galvanized, despite reports of weakness in the East, except for outdoor roofing business in the Southwest, which is highly competitive. Blue annealed sheets are reported fairly steady owing to a widely diversified miscellaneous manufacturing demand.

Current Finished Steel Prices

Prices in cents per pound unless otherwise stated

Steel Sheets

SHEET MILL BLACK, NO. 24

Pittsburgh base	2.35c
Philadelphia, delivered	2.64c
Gary, Indiana Harbor	2.45c
Chicago, delivered	2.50c
Birmingham, base	2.50c
St. Louis, del.	2.70½c

TIN MILL BLACK, NO. 28

Pittsburgh, base	2.55c to 2.65c
Gary, base	2.65c to 2.75c

GALVANIZED NO. 24

Pittsburgh, base	2.85c to 2.90c
Philadelphia, delivered	3.19c
Chicago, delivered	3.05c
Gary, Indiana Harbor	3.00c
Birmingham, base	3.05c
St. Louis, del.	3.25½c

BLUE ANNEALED SHEETS NO. 13

Pittsburgh, base	2.05c
Chicago, district mills	2.15c
Chicago, delivered	2.20c
St. Louis, delivered	2.40½c
Philadelphia, delivered	2.34c
Birmingham	2.20c to 2.25c

BLUE ANNEALED SHEETS NO. 9-10

Pittsburgh, base	1.90c
Chicago, district mills	2.00c
Chicago, delivered	2.05c
Philadelphia, delivered	2.19c
St. Louis, delivered	2.25½c
Birmingham	2.05c to 2.10c

AUTOMOBILE NO. 20

Pittsburgh, base	3.20c to 3.30c

FURNITURE NO. 24

Pittsburgh, patent leveled	3.60c

Tin and Terne Plate

Prices per 100 pound box Pittsburgh

Tin plate, coke base	$5.00

Gary, Ind., base 10 cents higher.

(Per pound)

Long ternes, 24, unassorted	3.25c to 3.35c

Wire Products

(To Jobbers-Merchant Trade)

F.o.b. Pittsburgh, Cleveland base

(Per 100 pound keg)

Standard wire nails	$1.90 and 2.00
Cement coated nails	1.90 and 2.00
Galvanized nails	3.90 and 4.00

(Per pound)

Polished staples	2.35c and 2.45c
Galvanized staples	2.60c and 2.70c
Barbed wire, gal.	2.55c and 2.65c
Annealed fence wire	2.35c and 2.45c
Galvanized wire	2.80c and 2.90c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c to 2.30c
Spring wire	3.20c to 3.30c
Wire, delivered Detroit	2.50c
Nails, delivered Detroit	$2.35

Joliet, DeKalb, Waukegan, Ill., Anderson, Ind., Chicago, $1 over Pitts.-Cleve.; Duluth and Worcester, Mass., $2 higher; Fairfield, Ala., $3 higher.

(Second-quarter asking prices $2 per ton above those levels, except fencing.)

Rivets

Struc. c.l., Pitts.-Cleve.	2.75c
Struc., c.l., Chicago	2.85c

**7/16-in., smaller, Pitts..70, 10 and 5 off
Chi., Cleve. ....70 to 70, 10 and 5 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Steel Plates

Base, Pittsburgh	1.65c
Philadelphia, del.	1.80½c to 1.85½c
New York, delivered	1.88c to 1.93c
Boston, delivered	2.00c to 2.05c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.83½c
Lackawanna, N. Y., base	1.70c to 1.75c
Birmingham, base	1.80c to 1.85c
Coatesville, Pa., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.05c to 2.15c
St Louis, del	1.95½c

Structural Shapes

Base, Pittsburgh	1.65c
Philadelphia, del.	1.76c to 1.81c
New York, del.	1.905c
Boston, del.	1.985c to 2.035c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.83½c
Lackawanna, N. Y., base	1.75c to 1.80c
Birmingham base	1.80c to 1.85c
Pacific Coast, c.i.f.	2.15c to 2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.65c
Chicago, base	1.70c to 1.75c
Birmingham base	1.80c to 1.85c
Lackawanna, N. Y., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.25c
Cleveland, base	1.65c to 1.70c
Philadelphia, del.	1.94c
New York, del.	1.98c
Boston, del.	2.05c
Pittsburgh, cold finish	1.75c to 1.80c
Pittsburgh, forg. qual.	1.85c to 1.90c

RAIL STEEL

Chicago Heights	1.60c to 1.65c
Eastern mills	1.55c

IRON

Chicago, base	1.70c to 1.75c
New York, delivered	1.93c to 2.03c
Philadelphia, delivered	1.89c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pitts., billet cut lengths	1.90c to 2.00c
Stock lengths, mill	1.65c to 1.75c
Chi., billet	1.85c to 2.00c
Chi., rail steel	1.60c to 1.70c
Chi., rail steel, less carload	1.90c
Philadelphia, cut lengths	2.19c
Cleveland, cut lengths	1.95c to 2.05c

Cold Finished Steel Bars and Shafting

Base, Pittsburgh, Chicago, Buffalo and Cleveland	2.10c
Shafting, turned and ground, mill	2.45c to 2.90c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot strip	19c	20.5c	23c	28c
Cold strip	28c	29.5c	32c	37c

Carbon 0.12 and under; no nickel. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads, Pitts. dist.	$6.50 to $6.75 off
Carloads, Chicago dist.	6.70 to 6.80 off

Alloy Steel

Hot Rolled—F.o.b. Mills

Alloy Quality Bar Base is 2.65c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	1.25-1.75 Ni.	1.05
2100	0.55	5100 .80 - 1.10 Cr.	0.45
2300	1.50	51.00 Cr. spring	0.20
2500	2.25	6100 bars	1.20
3100	0.55	6100 Spring	0.95
3200	1.35	Cr., Ni., Van.	1.50
3300	3.80	Carbon Van.	0.95
3400	3.20	9250 (flats)	0.25
4100 .15 to .25 Mo.	0.50	9250 (rds.,sq.)	0.50
4600 .20 to .30 Mo.			

Strip, Hoops Bands

Hot strip, to 6-in., Pitts.	1.65c to 1.70c
Hot strip 6 1/16 to 24-in. Pitts.	1.55c to 1.60c
Hot strip, bands 6 in. and under, Chicago	1.75c to 1.80c
Do. 6 1/16 to 24 in.	1.65c to 1.70c
Cooperage hoop, Pitts.	1.90c to 2.00c
Do, Chicago	2.00c to 2.10c
Cold rolled strip, Pitts., Cleve., 3 tons, over	2.25c to 2.35c
Worcester, 3 tons, over	2.40c to 2.50c

Rails, Track Material

Standard bess. and open hearth rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 28.00
Light rails, 25-45, mills	$34.00
Light rails, Chicago	$36.00
Angle bars, Chi. base	2.75c
Spikes, railroad, mills	2.80c
Spikes, railroad, 7/16-in. and smaller, Pitts.	2.80c
Spikes boat, barge, Pitts.	3.00c
Spikes, railroad, Chi.	2.80c
Track bolts, Pitts., steam roads	3.80c
Do. standard, jobbers	73 off list
Track bolts, Chicago	3.80c
Tie plate, mills	$39.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ....73 off

Rolled thread ⅝ x 6 and smaller take 10 per cent lower list.

Eagle list ....73 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ....73 off

Tire bolts, 60, 10 and 10 off.

Stove bolts, 80, 10, 10, 5 off in pkgs.; 80, 10, 5, 2½ off in bulk.

Rolled thread machine bolts, ⅝ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ....73 off

HEXAGON CAP SCREWS

Milled ....80-10-10-5 off

Upset 1 in. diam. and smaller....85-10 off

SQUARE HEAD SET SCREWS

Milled ....80-5 off

Upset 1 in. and smaller ....80-10-5 off

Upset, larger than 1 in. ....80-5 off

Cut Nails, Chain, Piling

Cut nails, c.l., Pittsburgh do, less carloads, 5 kegs or over, 2.65c; and less than 5 kegs, 2.80c.	2.40c
Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Sheet piling, Pitts.	1.90c

Bars

Second Quarter Price Advance Becomes General—Better Specifications, but Buying Is Slow

BAR PRICES, PAGE 67

Chicago—All bar producers now are on a basis of 1.80c for second quarter, effective April 1, subject in some instances to prior arrangements.

It is understood here a number of protections covering World's Fair buildings and other specific work already are being extended into second quarter on the basis of 1.70c. Other buyers have been notified that 1.80c is to be the price on all spot or contract buying after April 1. Fairly substantial sales have been made since prices have been discussed and the reports of higher quotations have aroused more second quarter inquiry. Road machinery builders have nearly doubled orders for bar products and shapes, while crane and conveyor makers have heavier bookings. Fair specifications are coming from automotive, bridge work and deformed bar groups, but a decidedly subnormal spring farm implement season has developed. Bar mills are about 60 per cent.

New York—Commercial steel bar specifications are coming out more freely, although until recently there has been little contracting for second quarter. Practically all sellers are now quoting 1.65c, Pittsburgh, on second quarter contracts, and are indicating their intention of following the lead of Carnegie Steel Co. in quoting 1.70c after March 31.

New York Central railroad is inquiring for its second quarter requirements, the amount being unstated.

Philadelphia—Steel bar sellers are generally speeding up current quarter specifications with promise of an advance in the new quarter although not all mills have named a definite new figure. Future inquiry is somewhat more active. Some mills are quoting 1.65c, Pittsburgh, on second quarter contracts with 1.70c to prevail April 1.

Youngstown, O.—Some comparatively small quantities of common steel bar orders are coming to makers on the strength of the generally announced advance of $2 a ton for April 1. Independent mills in some instances are accepting the new price level, but with the understanding that their established policy shall be adhered to, that automatically at the end of March all 1.60c tonnage remaining unspecified shall be canceled. Others propose that such 1.60c business as still remains at the end of this quarter to be delivered on specifications already in hand before April I shall be delivered at the mill's convenience.

District bar mills are operating on limited schedules, at about 45 per cent of capacity or less. The belief here is that 1.65c, Pittsburgh, will be asked on contracts for second quarter delivery, and 1.70c for such buyers as come into the market later without contracts.

Pittsburgh — Steel bar specifications are moderately heavier than a month ago. The recent advance is seen as having little effect upon recent buying and second quarter contracting also is slow. Producers appear firm on 1.65c, Pittsburgh, for second quarter contracting. Definite announcement from producers as to following the lead of Carnegie Steel Co. in naming 1.70c April 1 is lacking but intimations have been made that this procedure will be followed. A considerable portion of this month's improvement in business is traced to the automotive industry, with orders from all consumers limited in size.

Cleveland—Sales of merchant steel bars continue in moderate volume though most business is in release on contracts which expire April 1. Automobile interests in Toledo, O., are for the average of a large producer and parts makers, running at 60 to 70 per cent capacity. The price for second quarter is still in a transitory stage with general lack of consuming interest manifesting itself in slowness of consumers to close on contracts at 1.65c, Pittsburgh base, or 1.70c, Cleveland, for both local and outside deliveries.

Birmingham, Ala.—Recent announcement of advances on bars will hardly affect the market, most tonnage for second quarter delivery having been covered. Bar prices for second quarter will be 1.80c to 1.85c.

Plates

More Mills Increase Price for Second Quarter—New Business Increases Moderately

PLATE PRICES, PAGE 67

New York—Most platemakers have opened their books at 1.75c, Coatesville, Pa., on second quarter contracts, with 1.80c. Specifications generally are better. Dominating inquiry are the 7500 to 8000 tons of plates for the New York Central westside warehouse; and 1800 tons for the Rikers island penitentiary. The latter, it is understood, will be let direct by the cellmakers who are successful in obtaining the subcontract from M. J. Carlin, general contractor. Approximately 300 tons of plates for the cutting shield to be used in the construction of the Boston tunnel have been placed with the James Russell Boiler Works, Boston.

New York Central railroad is inquiring for an unstated amount covering second quarter requirements.

Philadelphia—Plate sellers are booking second quarter contracts at 1.75c, base Coatesville, Pa. At least two mills have not taken a definite stand as to new tonnage after April 1, although certain others have named 1.80c for that period. Aside from 3500 tons of plates, shapes and bars for alterations to two battleships little business is outstanding.

Pittsburgh — Plate business continues slightly heavier than a month ago. Recent specifications fail to indicate a stimulation as the result of higher prices named for second quarter. The new Pittsburgh postoffice will take 1200 to 1500 tons of sheet piling.

Cleveland—Current sales of steel plates are moderate, with another large independent this week in line with the Carnegie Steel Co. announcement in naming 1.65c to 1.70c, base. Pittsburgh, for second quarter. There is a marked absence of general inquiry for that period. American Shipbuilding Co. took the contract for 650 tons for tank tops for two steamers in dock here and bought plates from a leading independent. The Pennsylvania railroad takes bids March 26 on a plate girder bridge at Canton, O., taking about 100 tons of plates, reported 120-inch wide.

Chicago—Skelp shipments for pipe line work again are being reduced pending the scheduling of additional projects just let. Plate orders are being taken for immediate shipment at 1.70c, Chicago, but for second quarter the price will be advanced to 1.80c, except for protections on existing work and uncompleted projects. All producers have now gone on the 1.80c basis for second quarter, effective April 1. About 5000 tons

have been let for oil tank work in East Texas and on the coast, and 5000 to 8000 tons are out in potential inquiry.

Birmingham, Ala. — Fabricators have received numerous orders requiring in the aggregate a large amount of plates. Birmingham Tank Co. has orders which will warrant operating its plant here for several months on full time.

Contracts Placed

1500 tons, plates and shapes, two car floats for Inland Waterways Corp., to McClintic-Marshall Corp., Bethlehem, Pa.

650 tons, two tank tops, one 300-ton top for steamer GALLAGHER and one 350-ton top for steamer POLLOCK, both of Midland Steamship Line, to an independent mill through American Shipbuilding Co., Cleveland.

400 tons, 60 pontoons for United States district engineer, Portland, Oreg., to King Bros., Portland.

350 tons, plates and shapes, dredge boat hull for United States engineers, Memphis district, to Dubuque Boat & Boiler Works, Dubuque, Iowa.

300 tons, shields for Boston tunnel, to James Russell Boiler Works, Boston.

300 tons, corrugated culvert pipe for Great Northern railroad, Klamath Falls, Oreg., extension, to Beall Pipe & Tank Co., Portland, Oreg.

200 tons, 20-inch welded steel pipe, East Bay municipal utility district, Oakland, Calif., to Steel Tank & Pipe Co., Berkeley, Calif.

Contracts Pending

400 tons, tank for the Panama Canal commission, Washington; bids opened.

400 tons, four derrick scows for United States district engineer, Portland, Oreg; bids invited.

Cold-Finished Steel Bar Contracting is Dragging

Cold Finished Prices, Page 67

Cleveland—The market on cold-finished steel bars remains quotably unchanged at 2.00c to 2.10c, Cleveland base. Little interest has been manifest to date in second quarter needs from consumers, contract and spot takers alike. A slight though gradual improvement is to be noted from plants in the district making screw machine products. Automotive parts manufacturers are in line with this fair improvement.

Pittsburgh—Shipments of cold-finished steel bars continue moderately larger than a month ago but incoming business is no more than holding its own with shipments, and in some cases is slightly below this movement. Contracting remains slow. Books have been opened at 2.10c, Pittsburgh, unchanged from first-quarter price and the lack of an advance similar to that instituted on hot bars is aiding the closing on second quarter business.

Railroads

Rail Orders Pend in West—Shops Prepare for Reopening—Light Rails in Quiet Market

TRACK MATERIAL PRICES, PAGE 67

New York—Pennsylvania is opening bids March 26, for 500 tons of track spikes, wrought iron, carbon steel and copper bearing steel, 35,000 pairs of joint bars and 67,500 tie plates.

Pittsburgh—Specifications against recent orders for rails, track material, and other steel products are in fair volume and heavier than a month ago. The market is quiet in new inquiry although considerable tonnage outside of rails and fastenings is involved in pending work for the Pennsylvania and New York Central railroads. Light rails remain in a quiet market.

Cleveland—Nickel Plate will relocate its entrance into Toledo, O., following recent approval by the interstate commerce commission. The new stretch is to be 5½ miles long and with 110-pound rails would take about 2000 tons. It is probable that rails in the present entrance to Toledo will be used. The Wabash is understood to be planning use of the new line.

Chicago—Milwaukee and Rock Island roads are among western carriers expected to place rail orders early this season. Milwaukee announced recently it would buy 23,000 tons. Track fastening sales totaled 5000 tons. Recent closing of coal mines in the central bituminous district has cut down on light rail purchases. Reopening of a number of railroad shops in the West indicates that more finished steel will be placed soon for repair work. About 4000 tons is being allocated for the 500 stock cars being built for Northern Pacific. Elgin, Joliet & Eastern's order for 500 gondolas will take about 6000 tons. Union Pacific announces a budget of more than $70,000,000 for 1931, covering maintenance of way, equipment and capital expenditures. Of this amount, $60,000,000 will be spent on maintenance of way and equipment. Pennsylvania railroad may soon establish a freight car ferry across Lake Michigan between Milwaukee and Muskegan, Mich.

Car Orders Placed

Fisher Lumber Corp., Memphis, Tenn., 20 30-ton logging cars, to American Car & Foundry Co., New York.

Car Orders Pending

Pennsylvania Engineering Works, New Castle, Pa., 13 pairs of trucks of 75 tons capacity, bids asked.

Locomotives Pending

Union Pacific, 20 locomotive tenders and two gas-electric rail motor cars, specified in 1931 budget.

Sheet Bar, Billet, Slab Prices Reaffirmed

Semifinished Prices, Page 78

Cleveland—The leading merchant producer here has reaffirmed first quarter prices at $30, base, Cleveland and Youngstown, O., for second quarter on sheet bars, billets and slabs. Operations are steady, nine of 14 open hearths active.

Pittsburgh—Producers of rerolling billets, sheet bars and slabs continue to name $30 on new business with $36 quoted on forging billets. Wire rods are $37 for second quarter, an advance of $2 a ton over first quarter. Business in all grades continues light with little improvement noted since February. Practically all orders are limited to small lots for prompt needs.

Youngstown, O.—Consumers of billets, sheet bars and slabs are not contracting for second quarter. Nonintegrated mills are purchasing from time to time as they receive specifications for their own products. Billets, sheet bars and slabs are unchanged at $30, Pittsburgh and Youngstown, and wire rods are bringing the new price of $37, Pittsburgh and Cleveland.

Fluorspar Market Easier

Fluorspar Prices, Page 78

New York—Fluorspar demand is dull with the market nominally nearer $19 than $19 to $19.50, duty paid, per gross ton, as recently quoted. Better demand within the next month is expected to test the market. Imported ores are unchanged in price, and fresh inquiry is light.

Bids Asked on Cable

Brooklyn, N. Y.,—Signal supply officer takes bids March 31 on 51,600 feet of cable and 48 cable reels. The quartermaster at this base took bids March 11 on 400 rolls monel metal screening, 36 inches wide.

Structural Shapes

Fourteen Bid for Pennsylvania's 120,000 Tons—Inquiry in East Largely for Public Construction — St. Lawrence River Bridge to Take 7000 Tons

STRUCTURAL SHAPE PRICES, PAGE 67

New York—Fourteen bidders figured on all or part of the Pennsylvania railroad's 120,000-ton inquiry with the following eastern mills low on certain sections: American Bridge Co., McClintic-Marshall Corp., Phoenix Bridge Co., Lehigh Structural Steel Co., Shoemaker Bridge Co., and Belmont Iron Works. Material must be awarded by April 3.

New Jersey state highway commission, Trenton, N. J., is inquiring for 15,000 tons, viaduct, at Kearny, N. J., bids to open April 6. This makes more than 50,000 tons placed or pending for route 25, northern New Jersey. Fresh inquiry is largely limited to public construction. Private building is slow, except for small projects. No steel has been let thus far this year for subways. Fabricated steel prices show but slight evidence of firmer stand being taken by the mills. Awards are light, including 1000 tons for an armory and 1400 tons for a warehouse.

New York Central railroad is inquiring for an unstated tonnage of second-quarter shapes, bids April 6. Phoenix Bridge Co., Phoenixville, Pa., is opening books for second quarter at 1.65c, Pittsburgh, on contract tonnage and, in line with recent action by the Steel Corporation and others, is naming 1.70c after April 1.

Boston—There is some expectation that at least a portion of the steel to be used in the new post office for this city will be awarded within ten days. It will be six weeks or more before any steel for the East Boston vehicular tube under Boston harbor will be ordered.

Philadelphia — Although some doubt prevails in the trade as to the position of one important seller, shape prices appear upward with contract tonnage for second quarter quoted generally at 1.75c, eastern mill. Some mills have indicated 1.80c, eastern mill, as the going price after March 31.

Buffalo—R. S. McMannus Steel Construction Co. has been awarded a contract for 400 tons for the new fire headquarters here. One other order for 70 tons is the only other larger coverage of the week.

Pittsburgh—Structural steel demand lacks improvement. Small lot inquiry is fairly active while awards are light. Producers usually quote 1.65c, Pittsburgh, on second quarter contracts with 1.70c named in some instances.

Cleveland—Local award reached no sizeable figure over the past week and even small-lot work of under 100 tons was slow in point of awards. The market has been named at 1.65c and 1.70c, Pittsburgh, for second quarter. Fort Pitt Bridge Works took 1375 tons for a building at Ecorse, Mich., for Great Lakes Steel Corp. Pending work includes a 400-ton bridge for the Chesapeake & Ohio at Walbridge, O.; steel bridges for the Pennsylvania railroad at Steubenville, Centersburg, and Canton, O.; and a 2400-ton power plant at Detroit.

Chicago—Numerous bridge projects and many small building awards keep structural mills at a shade over 50 per cent. Chicago board of education will ask for figures shortly on about 6000 tons for three additional high schools. It is expected bids will be asked about June 1 for the Louisville & Nashville bridge over the Ohio river at Henderson, Ky., totaling 30,000 tons. Local bidders are following several pier and dock projects at Los Angeles and San Francisco. Spot plain material is booked at 1.70c, Chicago. State funds from automobile registration fees and gasoline taxes are being set aside at Springfield, Ill., for a survey for construction of an elevated highway into Chicago.

Birmingham, Ala.—Small tonnage business is being received by fabricators. Shops are operating five to five and a half days a week.

Awards Compared

	Tons
Awards this week	**31,151**
Awards last week	**146,484**
Awards two weeks ago	**41,258**
Awards this week in 1930	**26,426**
Av. weekly awards, 1930	**35,242**
Av. weekly awards, 1931	**38,551**
Av. weekly awards, Feb.	**26,659**
Total awards to date, 1930	**425,148**
Total awards to date, 1931	**501,163**

Contracts Placed

6000 tons, war memorial and opera house building, San Francisco, to Columbia Steel Co., San Francisco.

4000 tons, government hangars, Wright field, Dayton, O., reported awarded to Belmont Iron Works, Philadelphia; balance of approximately 9000 tons, expected to be awarded shortly.

3600 tons, transmission towers for Southern California Edison Co., Los Angeles. Allocated as follows; 850 tons to Pacific Coast Steel Corp., Los Angeles; 1250 tons to Emsco Derrick & Equipment Co., Torrance, Calif.; and 1500 tons to McClintic-Marshall Corp., Bethlehem, Pa.

2250 tons, Harlem avenue bridge, Chicago, to American Bridge Co., Pittsburgh.

1900 tons, bridge for Indiana Harbor Belt Line railroad, Chicago, to Mississippi Valley Structural Steel Co., Chicago.

1400 tons, warehouse, Speare & Co., West Twenty-third street, New York, to Levering & Garrigues Co., New York.

1375 tons, mill building, for Great Lakes Steel Corp., Detroit, to Fort Pitt Bridge Works, Pittsburgh.

1000 tons, Administration building, 369th infantry, 142nd street and Fifth avenue, New York, to an unstated fabricator; C. & W. Construction Co., general contractor.

1000 tons, Star-Chronicle building, St. Louis, to Mississippi Valley Structural Steel Co., Chicago.

680 tons, St. Anne's church, San Francisco, to McClintic-Marshall Corp., Bethlehem, Pa.

645 tons, deck plate girder span, Indiana, Pa., for Pennsylvania railroad, to American Bridge Co., Pittsburgh.

645 tons, foundation for post office, Pittsburgh, to McClintic-Marshall Corp., Bethlehem, Pa.

500 tons, bridgework, Illinois highway commission, to Vincennes Bridge Co., Vincennes, Ind.

487 tons, new floor, pier 11, Philadelphia, to American Fabricated Steel Co., Philadelphia.

450 tons, bridge over Calumet river, Sag harbor, East Chicago, Ind., to American Bridge Co., Pittsburgh.

450 tons, hangar, Hampton Roads, Va., to Belmont Iron Works, Philadelphia.

410 tons, addition to Wise-Smith Co., Hartford, Conn., to Levering & Garrigues Co., New York.

400 tons, fire department headquarters, Buffalo, to R. S. McManus Steel Construction Co., Buffalo.

250 tons, bridge in Yellow Medicine county, Minn., to Wausau Iron Works, Wausau, Wis.

250 tons, Livestock building, Sacramento, Calif., to Judson-Pacific Co., San Francisco.

250 tons, 4-story addition, St. Agnes hospital, White Plains, N. Y., to B. Schacht & Sons, Bronx, N. Y.; Frank O'Hare Co., general contractor.

250 tons, hotel, Southern Hotel Co., Clovis, N. Mex., to Mosher Steel & Machinery Co., Dallas, Tex.; H. W. Churchill Construction Co., Dallas, Tex., general contractor.

225 tons, apartment, Mount Vernon, N. Y., to Cosmic Iron Works, Bronx, N. Y.

225 tons, addition, high school, Paulsboro, N. J., to Bethlehem Fabricators Inc., Bethlehem, Pa.

200 tons, apartments, Twenty-ninth and Thirtieth streets, Astoria, to Emilnick Iron Works, Astoria, N. Y.

180 tons, shop buildings, 15th and

Washington streets, Philadelphia, for United States government, to Bethlehem Fabricators Inc., Bethlehem, Pa.

175 tons, elementary school, 12th and Columbia streets, Philadelphia, to Bethlehem Fabricators Inc., Bethlehem, Pa.

175 tons, three state bridges, New York, to American Bridge Co., Pittsburgh.

155 tons, I-beam stands, to A. C. Woods Co., Brocton, Ill.

150 tons, Hugh M. Brown junior high school, Washington, to Deitrich Bros., Baltimore; Arthur L. Smith & Co., 2539 Pennsylvania avenue, Washington, general contractor. Concrete Steel Co. awarded 50 tons, concrete reinforcing bars.

150 tons, state highway bridge, Ohio, to American Bridge Co., Pittsburgh.

131 tons, shapes and bars, Robert E. Lee school, Dallas, Tex., 87 tons shapes to Mosher Steel & Machinery Co., Dallas, 44 tons bars to Austin Bros., Dallas; Eckert-Burton Construction Co., Dallas, general contractor.

125 tons, highway bridge, Connecticut, to American Bridge Co., Pittsburgh.

120 tons, addition, Providence hospital, Washington, to Lehigh Structural Steel Co., Allentown, Pa.

120 tons, building for Muirson Label Co., Peoria, Ill., to Midland Structural Steel Co., Chicago.

111 tons, highway work, Ventura county, Calif., to unstated interest.

110 tons, highway bridge, Virginia, to Roanoke Iron Bridge Co., Roanoke, Va.

105 tons, hangar for Pacific Air Transport Co., Seattle, to Isaac Iron Works, Seattle, through Austin Co., Seattle.

102 tons, bridge, Washington, R. I., for New York, New Haven & Hartford railroad, to Boston Bridge Co., Boston.

100 tons, building extension, Newport, R. I., bureau of yards and docks, navy department, to James Tower Iron Works, Providence, R. I.; Lamoureux Bros., Woonsocket, R. I., general contractors.

100 tons, apartment, Thirtieth street, Long Island City, N. Y., to J. Klein Iron Works, Astoria, N. Y.

100 tons, parochial grade school, Plainfield, N. J., to Elizabeth Iron Works, Elizabeth, N. J.

100 tons, water tower, Cedar Rapids, Iowa, to Wausau Iron Works, Wausau, Wis.

Contracts Pending

15,000 tons shapes, 400 tons steel castings and 7570 lineal feet steel railing, superstructure, highway viaduct, Kearny, N. J., route 25, connecting link, section 4A; bids April 6, New Jersey state highway commission, A. Lee Grover, chief clerk, Trenton, N. J., contract 46.

7000 tons, bridge over St. Lawrence river between Lachine and Caughnawaga, Que., for department of public works, Provincial government, Quebec, Que.

7000 tons, St. Louis, for East St. Louis union station approach.

2400 tons, power plant structure, for Detroit.

2000 tons, training school, Warwick, N. Y.

1500 tons, Connecticut avenue bridge, for Baltimore.

1500 tons, prison hospital, Wingdale, N. Y.

1245 tons, building for United States embassy, Paris, France.

1200 tons, bridges for Milwaukee Electric Railway & Light Co., Milwaukee.

1000 tons, postoffice, Camden, N. J.; bids readvertised.

1000 tons, bridge over York river, Gaspe, Que., for Gaspe Bridge Co. Ltd.

1000 tons, New York Training school for boys building, unstated address, bids taken through state, Albany, N. Y.

1000 tons, Y. M. C. A. building, Toledo, O.

1000 tons, City National Bank building, Lansing, Mich.

1000 tons, highway bridges, New York.

905 tons, route 40, section 5, New Jersey state bridge; bids March 31.

835 tons, structural steel, anchor bolts and expansion plates, bridge, Lock Haven, Pa., Pennsylvania railroad, bids March 26. Bids will also be taken for a bridge at Canton, O.

750 tons, addition to Syracuse Armory, Syracuse, N. Y.; bids March 24.

600 tons, bascule bridge, Seattle, for Northern Pacific railroad.

600 tons, public school, 229, Benson avenue and Fourteenth avenue, Brooklyn, N. Y.; bids March 31.

500 tons, power house for Iowa Railway & Light Co., Cedar Rapids, Iowa.

500 tons, estimated, pier sheds, San Francisco.

500 tons, state hospital, Holmdel, N. J.

450 tons, temporary bridge over Chicago river, South Halsted street, Chicago.

450 tons, public school 36, Jefferson boulevard, Annadale, Staten Island, N. Y.; bids March 31.

400 tons, bridge, Walbridge, O., for Chesapeake & Ohio railroad.

360 tons, Iowa bridge work.

360 tons, Iowa bridgework; bids March 17.

350 tons, high school, Quincy, Ill.

345 tons, unloading tower, Conway, Pa., for Wellman Engineering Co., Cleveland.

280 tons, state bridge, Allegheny county, Pa.; bids April 9.

250 tons, locks in Illinois river at Kampsville and LaGrange, Ill., Independent Bridge Co., Pittsburgh, low.

220 tons, lift bridge at Kaukauna, Wis., general contract to C. R. Meyer, Oshkosh, Wis.

200 tons, District of Columbia reformatory, Lorton, Va., Lehigh Structural Steel Co., Allentown, Pa., low.

200 tons, highway bridge, Maine.

150 tons, bridge over Yamaska river, Cownsville, Que., for department of public works, Provincial government, Quebec, Que.

140 tons, school building, Townsend, Mass.

125 tons, Davenport street bridge, Rhinelander, Wis., bids close April 2.

120 tons, school, Williamsport, Pa.

115 tons, naval hospital unit, Chelsea, Mass.

109 tons, bridge over Lytle creek, San Bernardino county, Calif.; bids received.

Unstated tonnages, two bridges for Pennsylvania railroad, at Steubenville and Centerburg, O.

Concrete Bars

Awards Are Largest for Any Week This Year—6750-Ton Sewage Plant Awarded—Inquiry More Active Than Month Ago—Federal Work Large in West

REINFORCING BAR PRICES, PAGE 67

Chicago—Prospective reinforcing bar work is broadening. Important road building contracts will be let shortly in addition to 800 tons of Indiana and Illinois surfacing a week ago. Rail steel bars have been cut sharply in price on several recent projects. Billet bars are 1.85c to 2.00c. A 1400-ton ore dock has been let at Marquette, Mich., and about 1200 tons additional in miscellaneous awards, including a 500-ton grain elevator at Chicago Heights. University of Chicago's expansion plan includes 30 buildings. About 37 federal post office buildings are being planned for Illinois alone.

Awards Compared

	Tons
Awards this week	**18,744**
Awards last week	**5,324**
Awards two weeks ago	**14,112**
Awards this week in 1930	**17,108**
Av. weekly awards 1930	**6,990**
Av. weekly awards, 1931	**7,471**
Av. weekly awards, Feb.	**5,251**
Total awards to date, 1930	**84,923**
Total awards to date, 1931	**97,128**

New York—Concrete reinforcing bar prices continue to be shaded for attractive volume. A large tonnage is pending. Inquiry for highway construction requirements is heavier. On small lots prices are fairly steady.

Buffalo—The Ontario government has awarded contracts on 89 miles of concrete highway construction, for which about 3000 tons of reinforcing steel will be required, including bridges.

Pittsburgh—Reinforcing bar business continues more active than a month ago. Local awards and inquiry are fairly active in small lots but large lots are scarce. Producers continue to name 1.65c, Pittsburgh, for stock lengths and 1.90c for cut lengths.

Cleveland—Awards are particularly slack this week, even on small jobs of minimum-sized tonnage. The Huron road hospital job went in for general contractors' award March 23. The city's tuberculosis sanitarium for City Hospital went in for bids March 26.

Birmingham, Ala.—Bids are out on several reinforced concrete projects in Louisiana and elsewhere in

(Concluded from Page 71)

Strip

Moderate Stimulation Follows Recent Advance—Buying Is on Increase—Real Test Lacking

STRIP PRICES, PAGE 67

Pittsburgh—Specifications against first quarter strip contracts have been stimulated only moderately by the recently announced advance in prices. Incoming business is well maintained and heavier than a month ago. Second quarter contracting is confined to small buyers, the market lacking test on large tonnages. Producers are quoting 1.70c and 1.60c for the two sizes of hot strip, an advance of $1 a ton over the former market, while 2.35c for cold-rolled compares with 2.25c for several months past.

New York—Strip specifications are improving slowly, with a newly announced increase of $1 a ton needing further test. Meanwhile hot strip may be quoted 1.55c to 1.60c, Pittsburgh for wide, and 1.65c to 1.70c for narrow. Cold-rolled continues 2.25c to 2.35c. Action is still pending on a substantial tonnage of pickled hot strip steel for the Metropolitan Square-Radio City.

Philadelphia — Business in hot strip is moving mainly at the old prices of 1.55c, Pittsburgh, for wide and 1.60c for narrow. A small amount is going at the recently announced advance of $1 a ton. The real test is expected within a fortnight. Cold-rolled strip is 2.25c to figure.

Youngstown, O.—The expected showdown with automotive interests as outcome of the March 12-14 submission of quotations for second quarter, seems to have been disappointing to most mills. It has not brought to light much information or much new business. About half the automotive concerns that asked for the prices have made no response. Other strip-consuming lines are continuing to take about the usual tonnages of narrower widths.

Chicago—Hot-rolled strip operations have been increased to about 50 per cent capacity from 40 to 45 per cent of last week, due to heavier automotive and miscellaneous orders. Cold-rolled demand is unchanged. Second quarter prices are untested.

Cleveland—Sales of cold-rolled strip at 2.35c, Cleveland, have been made over the past week though some interests report this figure yet to be tested. Indecision over price both from consuming and selling interests apparently holds the front in the strip market, one mill being advised to take orders to March 15 at the lower prices and release on this material only until April 1, but apparently this effort has not been seriously considered. Customers asking for protection until July 1 are the exception. Recently announced prices are 2.35c, Cleveland on cold; 1.60c and 1.70c, Pittsburgh base, on wide and narrow hot, respectively.

Warehouses Look to Spring Building for Gains

Warehouse Prices, Page 89

New York—Warehouse buying is spotty, the total volume showing little improvement. Prices are still somewhat mixed, though most distributors are adhering to the quantity extra list recently announced. Cold drawn material is steady. Slightly increased building operations have not yet been reflected materially in warehouse buying.

Boston—Resumption of building operations on small projects has developed a little better business for warehouse interests in the past week.

Philadelphia—Warehouse demand is still spotty, with prices unchanged. Jobbers contemplate only a slight daily increase for the month.

Buffalo—Warehouse demand has been slightly less active during the past week.

Pittsburgh—Sales remain dull and little changed since February. Business is confined to small lots. Sheets continue quiet.

Cleveland — Featuring the local warehouse market is the consistency in number of orders still, however, of moderate volume. Prices are unchanged.

Detroit—Orders for iron and steel products from warehouse have shown continued tendency to become slightly more numerous, but the increase in tonnage is comparatively light. Prices remain unchanged.

Cincinnati—Jobbers report, improved demand noted early this month is being maintained, volume to be considerably greater than in January and February. Prices are unchanged.

St. Louis—Warehouse interests report prospects for trade over the next month the most hopeful since fall. Municipal improvements, highway construction and other engineering projects are expected substantially to augment demand from now on.

Chicago—Buying of steel from stock improved notably the last ten days. Thus far business for March has been the lowest for that month since 1922. Fair orders for bars and plates are noted.

Operating Rate Shows First Loss Since Holidays

Youngstown, O.—Steel plant operations this week are unchanged from last week at 51 per cent of capacity. Sheet production is at approximately 50 per cent, off perhaps five points from last week. At Niles, O., 27 units are now under power, against 31 a week ago. Unchanged operations are reported by Sheet & Tube at 40, Carnegie at 50, Republic at 58, Sharon Steel Hoop at 60 to 65, and Newton Steel at 70 per cent.

Philadelphia—Ingot operations of Eastern mills are down one point this week to 51 per cent capacity, with a leading producer operating at 53 per cent.

Pittsburgh — Ingot production is slightly higher at 50 to 55 per cent, against 50 last week. Another steelworks blast furnace has been lighted giving the district 22 active of 54. Sheet production is unchanged at 45, with tin plate higher at 75 to 80. Strip output has advanced to 55 to 60, with pipe unchanged at 35.

Buffalo—Another curtailment has taken place in steelworks operations reducing output five points to 46 per cent of ingot capacity. This rate is expected to continue for the remainder of the month with April production uncertain.

Cleveland—Ingot operations have tapered two points with the closing down of one open-hearth furnace for repairs. Twenty-three of 34 furnaces are pouring at a 68 per cent rate. Report that a large independent would start up furnaces idle in this district for the past eight months is groundless.

Chicago—For the first time since Jan. 15, percentage of steel production remains virtually unchanged, without the usual 1 to 2-point weekly gains. Ingot output is the same as a week ago, or fractionally above 60 per cent. Sixteen of the 36 steelworks blast furnaces are blowing. Sheet mills continue at 78 per cent, and rail mill capacity is 55 per cent engaged.

Birmingham, Ala.—Sixty-five per cent capacity continues for district ingot operation though Tennessee Coal, Iron & Railroad Co. gives 70 per cent on all operations. Sixteen open-hearth furnaces in district are producing ingots.

Concrete Bars

(*Concluded on Page 75*)

the South. Several federal-aid projects are now under consideration in this section.

Contracts Placed

6750 tons, sewage treatment works, Ward's island, New York, to McClintic-Marshall Corp., Bethlehem, Pa.

5000 tons, sewage treatment works, Chicago sanitary district, Stickney, Ill., to Concrete Engineering Co., Chicago.

1400 tons, ore dock, Marquette, Mich., to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, Indiana road work, to Concrete Engineering Co., Chicago.

500 tons, grain elevator, Chicago Heights, Ill., to Inland Steel Co., Chicago.

425 tons, highway route 38, section 2, New Jersey, to National Steel Fabric Co., New York, through S. J. Groves & Sons Co., general contractor.

350 tons, Palais Royal warehouse, Washington, to Concrete Steel Co., New York..

350 tons, barrack buildings, Camp Normoyle, Tex., to Alamo Iron Works, San Antonio, Tex.; A. J. Rife Construction Co., Dallas, Tex., general contractor.

300 tons, school building for College of The Holy Name, Oakland, Calif., to Concrete Engineering Co., San Francisco.

300 tons, Veterans' hospital, Indianapolis, to Inland Steel Co., Chicago.

300 tons, dormitory, University of California, Westwood, Calif., to unstated company.

300 tons, public school, Philadelphia, to Concrete Steel Co., Pittsburgh.

265 tons, Baltimore street bridge over Gwynn's falls, Baltimore, to Joseph T. Ryerson & Son Inc.; W. C. Briddell Co. Inc., Baltimore, general contractor.

253 tons, Texas state prison system, Sugarland, Tex., to Alamo Iron Works, San Antonio, Tex.

230 tons, bridges, route 4, section 4, New Jersey, to Truscon Steel Co., Youngstown, O., through Bates & Rogers Construction Co., general contractor.

225 tons, telephone building, Lispenard street, New York, to Carroll & McCreary & Co., Brooklyn, N. Y.

220 tons, 170 tons road work for Wayne county, Michigan, and 50 tons for zoological park, Detroit, to Capitol Steel Corp., Detroit.

210 tons, bridge, route 4, sections 3 and 4, New Jersey, to American Steel & Wire Co., Chicago, through S. S. Thompson & Co., general contractors.

200 tons, 12-story store and apartment, Pennsylvania avenue, Washington, to Capital Fireproof Products Corp., Washington.

200 tons, 7-story apartment, Randolph and Fourteenth streets, Washington, to Hudson Daugherty Co., Washington.

200 tons, Illinois road work, to Concrete Engineering Co., Chicago.

150 tons, superstructure for Randolph street viaduct, Chicago, to Kalman Steel Co., Chicago.

110 tons, hotel, Southern Hotel Co., Clovis, N. Mex., to Orange Car & Steel Co., Orange, Tex.; H. W. Churchill Construction Co., Dallas, Tex., general contractor.

106 tons, shapes, bars and joists, junior high school, New Canaan, Conn., 31 tons shapes to McClintic-Marshall Corp., Bethlehem, Pa., 75 tons, bars and joists to Truscon Steel Co., Youngstown, O.; T. J. Pardy Construction Co., Bridgeport, Conn., general contractor.

100 tons, store, Willshire boulevard and New Hampshire street, Los Angeles, to Soule Steel Co.

100 tons, Bell street viaduct, Seattle, to Pacific Coast Steel Corp., Seattle, through General Construction Co., Seattle.

Contracts Pending

4000 tons, Sixth street bridge, Los Angeles; opening of bids postponed.

3000 tons, for first 1931 highway and bridge construction projects, Province of Ontario, Canada, several contracts already awarded.

2200 tons, foundation, St. John's park terminal warehouse, New York, for New York Central railroad.

800 tons, highway route 2, section 6, Hasbrouck Heights, N. J.; bids April 13.

325 tons, highway, route 3, sections 1A and 2A, Secaucus, N. J.; bids April 6, New Jersey state highway commission, A. Lee Grover, chief clerk, Trenton, N. J. This contract also includes reconstruction 8933 feet trolley track.

275 tons, highway, Mt. Vernon, N. Y., Westchester county park commission; bids March 30.

270 tons, highway, Palisade avenue to New York avenue, Fort Lee; and route 1, section 7, New Jersey; bids April 13.

210 tons, tunnel under Memorial parkway to Arlington cemetery, Virginia shore, Arlington Memorial bridge project, Washington; bids April 8.

200 tons, high school building, Minneapolis.

200 tons, Goldberg apartment and store building, Lincoln avenue, Chicago.

142 tons, plant for Teegardin Products Co., Seattle; Austin Co., Seattle, general contractor.

130 tons, state bridge, Allegheny county, Pa.; bids April 9.

108 tons, highway work, Mendocino county, Calif., bids received.

100 tons, district commissioners, Washington, Deitrich Bros., Baltimore, and Concrete Steel Co., New York, low on various items.

100 tons, route 40, section 5, New Jersey state bridge; bids March 31.

Obituaries

(*Concluded from Page 31*)

eral banks, and a member of the Society of Automotive Engineers, National Machine Tool Builders' association, Society of American Mechanical Engineers and was active in civic and educational fields. He served several terms as president of Connecticut chamber of commerce. At one time he was vice president of Bullard Engineering Works Inc.

Pipe

Line Projects Continue Slow to Close—Chicago Municipal Work Active—Prices Spotty

PIPE PRICES, PAGE 89

New York—Cast iron pipe prices are weak, $38 being bid for a portion of the Brooklyn yard stock requirements last week. This includes hauling and stacking. Bids will be taken March 30 for Manhattan yard stocks and fittings. Requirements are far below those of other boroughs.

Inquiry for 30,000 tons of steel pipe for the North Central Gas Co., New York, has been withdrawn.

Buffalo—Plans are under discussion for a 75-mile pipe line from the gas fields recently discovered near Tioga, Pa., to Williamsport, Pa. Construction will be started at once if early pressure in the field is maintained.

Pittsburgh—Continued hesitancy is noted in closing on several pipelines. The North Central Gas Co. line remains to be closed while a number of details have not been worked out on other projects.

Chicago—From 10,000 to 12,000 tons of municipal cast pressure pipe is active, and scattered lots of private work. Milwaukee took bids the first of the week for 6000 tons of 36 to 54-inch cast.

Birmingham, Ala.—Cast iron pipe prices have been reduced, $35 to $36, 6-inch and over sizes, being announced. New awards are fairly good in aggregate and production is at about 70 per cent of capacity.

Cast Pipe Placed

5000 tons, various sizes, with fittings, for Baltimore, bureau of water supply, to R. D. Wood & Co., Florence, N. J.

3500 tons, 6, 8 and 12-inch for Chicago, to Lynchburg Foundry Co., Lynchburg, Va., Glamorgan Pipe & Foundry Co., and Alabama Pipe Co., Birmingham, Ala., at $41 to $42, delivered.

1500 tons, water mains, Pembrook, Mass., to Herbert Kennedy Co. Inc., New York; bell spigot, pipe joints, gate valves, valve boxes and hydrants, to Chapman Valve Mfg. Co., Indian Orchard, Mass.; valves, joints, valve boxes and hydrants also awarded Columbia Iron Works, Chattanooga, Tenn.

600 tons, 4 to 24-inch class 150 centrifugal, for Bellingham, Wash., to United States Pipe & Foundry Co., Burlington, N. J., through H. G. Purcell, Seattle.

300 lengths, 6-inch, West Springfield, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

200 tons, for North Tonawanda, N. Y., board of public works, to United States Pipe & Foundry Co., Burlington, N. J.

150 tons, 2, 8 and 10-inch, for Stevens Point, Wis., to American Cast Iron

Jefferson County Court House, Birmingham
Architects—Holabird & Root
Associate Architect—Harry B. Wheelock
Fabricators—The Ingalls Iron Works Company
Contractors—Southern Ferro Concrete Company

The Sinews for the South's Buildings are wrought from TENNESSEE STEEL

The Jefferson County Court House at Birmingham is still another imposing civic monument in the erection of which Tennessee Structural Steel has played an important part.

Sturdy, finely proportioned dignity—superior strength—fire-safeness—enduring value—have been attained in this and countless other structures of every conceivable size and type, from coast to coast, through the use of Tennessee Products which include not only structural shapes, plates and bars, but a full line of sheets, rails, track accessories, semi-finished steels and pig iron.

TENNESSEE COAL, IRON & RAILROAD COMPANY

General Offices: Brown-Marx Building, Birmingham, Ala.

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AMERICAN SHEET AND TIN PLATE COMPANY
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COLUMBIA STEEL COMPANY
CYCLONE FENCE COMPANY
FEDERAL SHIPBUILDING AND DRY DOCK COMPANY
ILLINOIS STEEL COMPANY
MINNESOTA STEEL COMPANY
NATIONAL TUBE COMPANY
OIL WELL SUPPLY COMPANY
THE LORAIN STEEL COMPANY
TENNESSEE COAL, IRON & R. R. COMPANY
UNIVERSAL ATLAS CEMENT COMPANY

Pacific Coast Distributors—Columbia Steel Company, Russ Building, San Francisco, Calif.
Export Distributors—United States Steel Products Company, 30 Church Street, New York, N. Y.

Pipe Co., and McWane Cast Iron Pipe Co., Birmingham, Ala.

123 tons, 12-inch, Millis, Mass., to Warren Foundry & Pipe Co., Phillipsburgh, N. J.

100 tons, 12-inch cast for Lorain, O., to James B. Clow & Sons, Chicago.

50 lengths, 4-inch, West Springfield, Mass., to Warren Foundry & Pipe Co., Phillipsburgh, N. J.

50 tons, 6-inch, Millis, Mass., to Warren Foundry & Pipe Co., Phillipsburgh, N. J.

Steel Pipe Placed

6000 tons, approximately, 50 miles, 12-inch oil line pipe for Texas Co.'s lines from East Texas to the Gulf of Mexico, to A. O. Smith Corp., Milwaukee.

Cast Pipe Pending

4835 tons, 6, 8 and 12-inch, yard stocks, Brooklyn, N. Y., bids March 18; 1100 tons, 12-inch, R. D. Wood & Co., Florence, N. J., $38; 1200 tons, 8-inch, United States Pipe & Foundry Co., Burlington, N. J., and R. D. Wood & Co., both $38.50; 1200 tons, 8-inch, R. D. Wood & Co., $38; 1112 tons, 6 and 8-inch, Donaldson Iron Works and Central Foundry, both $39. Low bidders on 303 tons, special castings, 370 tons, valve box castings, 275 hydrants and approximately 1100 valves, mostly 6 and 8-inch, included Ray-Mont Products Co., Donaldson Iron Works, Dewey Bros., Kennedy Valve Mfg. Co. and M. & H. Valve Mfg. Co., Anniston, Ala.

3800 tons, 6 to 12-inch, for Cincinnati, bids in on general contract.

362 tons, mostly 6 and 12-inch, 68 tons special castings, 254 tons valve box castings, 300 hydrant stand-pipes and bonnets, 925 six-inch valves, 100 hydrant fenders and approximately 60 tons of high pressure cast iron pipe and special castings for borough of Manhattan, yard stocks; bids March 30.

350 tons, various sizes, Yarmouth, Mass.; bids opened, no award.

328 tons, 10 and 14-inch class B pipe, improvement Lomita park district, Redwood City, Calif.; bids received.

304 tons, 8 and 16-inch, Leominster, Mass.; bids opened week of March 23.

225 tons, 3, 6 and 8-inch, waterlines and sewer, Central Islip hospital, Long Island, N. Y.; bids in.

100 tons, or more, water main extensions, Middletown, N. Y., Fuller & McClintock, engineers; bids April 13.

100 tons, or more, water lines, Rochester state hospital, New York; bids April 1.

100 tons, miscellaneous cast fittings for Sixty-eighth street pumping station, Chicago; bids in.

100 tons, 6 to 12-inch, Saugus, Mass.; bids opened March 24.

Steel Pipe Pending

2650 tons, including 2500 tons seamless steel boiler tubes, contract 10, and 150 tons, steel pipe, contract 11, Pennsylvania railroad; bids March 31.

3320 feet, 28 and 32-inch, electrically welded, for United States engineers, St. Louis district; McClintic-Marshall Corp., Bethlehem, Pa., low.

Unstated tonnage, 12-inch, from Memphis, Tenn., to Covington, Ripley, Brownsville, and Jackson, Tenn., as first step in a $3,500,000 expansion program planned by Memphis Natural Gas Co., D. C. Shaffer, general manager; bids will be opened about April 1.

Wire

Small Increase Shown in Demand—Second Quarter Contracting Slow in Developing

WIRE PRICES, PAGE 67

Chicago—Jobber sales of common wire products have picked up, but dealer business has been checked by blocked roads in many northern rural districts. Southern market are quiet. Prices for plain wire to buyers not under contract are based on 2.35c, Chicago or western mills. Nails are quoted $2.05 to $2.15. Manufacturers' wire specifications are increasing more rapidly than common wire.

New York—Although a real test of the recent advance of $2 on most wire products will not likely take place much before the new quarter, most sellers are quoting a $2, Pittsburgh, minimum on nails and 2.30c, Pittsburgh, minimum on plain bright wire, with some protections out at the old figures. Specifications on both products are somewhat freer, reflecting not only the upward tendency of the market but also more favorable seasonal conditions.

Pittsburgh—Wire business, slightly larger than a month ago, lacks a definite change from the rate of recent weeks. Buyers are rather apathetic toward new contracting and are deferring signing for second quarter business except in the case of small users. Producers are quoting $2 a keg to jobbers for wire nails, 2.30c for plain wire and $37 for wire rods. A better movement is noted in the Southeast and barbed wire is considerably more active than a month ago. Manufacturers' wire continues to move slowly to practically all users. Cut nails are fairly steady at $2.40 a keg and although second quarter price announcement is lacking, intimations are heard of a probable advance shortly.

Cleveland—Prices of wire and wire products are still uncertain with lack of consuming demand meaning failure to test recently announced levels $2 higher. Rods, however, have proved an exception, several sales recently going at $37 a ton, Pittsburgh, the newly announced level. Nails have not been tested at $2.00 to $2.10 a keg. Customers are not building backlogs and prompt shipment is the rule.

Bolt, Nut, Rivet Second Quarter Contracts Active

Bolts, Nuts, Rivets Prices, Page 67

Pittsburgh—Second quarter contracting for bolts, nuts and rivets is more active, with business being signed on the basis of 73 off for bolts and nuts and 2.75c, Pittsburgh, for large rivets. Specifications are off slightly and business lacks improvement over the February rate. Production holds around 35 to 40 per cent.

New York—Little improvement is noted in bolt demand. Eastern producers are still operating around 35 per cent. Action is expected momentarily on the award of 250 tons of ¾-inch bolts for the Boston traffic tunnel.

Cleveland—With less shading noted, the bolt and nut market is in the best price position in some time. Orders continue in improved volume and March almost certainly will show the fourth monthly gain in new business. Improvement among consuming interests is general, the only exception being implement makers. Automotive concerns in the Detroit district have taken increased quantities of bolts and nuts. Bolts and nuts continue at 73 off list, Cleveland base. Rivets are 2.75c, Cleveland.

Chicago—Specifications for bolts and nuts show little improvement. Not much hope is seen for early business from farm equipment buyers. Producers report they are entering second quarter with a firmer price structure and fewer concessions among jobbers.

Tin Plate Output Moves Up Again; Orders Light

Tin Plate Prices, Page 67

Pittsburgh—Tin plate operations have resumed their upward trend, the current average being two to three points higher at 75 to 80 per cent, against 75 a week ago. The leading interest now is running slightly above 75. Specifications are moderately heavier although still below the usual seasonal rate. The outlook for the immediate future is regarded as favorable. Tin plate continues $5 per base box, Pittsburgh.

New York—Tin plate production at about 75 per cent is going ahead largely on contracts, little new business being reported. Spot demand is lacking, particularly as applied to foreign buying.

Raw Material Prices

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago furnace	$17.50
Pittsburgh, dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Valley furnace	17.00
Cleveland fur., local del.	17.00
Philadelphia, delivered	17.76
Virginia, furnace	17.75
Granite City, Ill., fur.	17.50
Buffalo, fur., local del.	17.50
Buffalo, del. Boston	21.41 to 21.91
Buff., all-rail, Brooklyn	19.91 to 20.91
Buff., all-rail Newark	18.28 to 18.78
Ala., Bir. fur., local del.	12.00 to 13.00
Alabama, del. Chicago	17.01
Alabama, del. St. Louis	15.42
Alabama, del. Cincinnati	14.69 to 15.19
Ala., Phila., dock del.	16.25
Ala., Balt., dock del.	16.00
Alabama, New York dock	16.50
Ala., Boston dock del.	16.75
Tenn., Bir. base, local del	13.00
Tennessee, del. Cinn.	14.69 to 15.19
Montreal, delivered	23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	18.00
Buff., all-rail, Brooklyn	20.91 to 21.41
Buffalo, all-rail Newark	18.78 to 19.28
Buffalo, del. Boston	21.91 to 22.41
Virginia furnace	18.25
Eastern, del. Phila.	18.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	19.00
Eastern, del. Phila.	18.76 to 19.26

MALLEABLE

Valley furnace	17.00
Cleveland fur., local del.	17.00
Pittsburgh dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Chicago, furnace	17.50
Buffalo fur., local del.	18.00
Eastern Penna., delivered	18.26 to 20.91
Granite City, Ill., fur.	17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Eastern Penn., del.	17.25 to 17.75
Buffalo fur., local del.	17.00
Montreal, delivered	20.50
Valley, furnace	17.00

BESSEMER

Valley furnace	17.00
Pittsburgh, delivered	18.13 to 18.63
Pittsburgh, furnace	17.50

LOW PHOS.

Valley fur., standard	27.00
Philadelphia, standard	24.76 to 27.79
Copper-bear., E. Pa. fur.	22.50 to 23.00

GRAY FORGE

Valley furnace	16.50
Pittsburgh district fur.	17.00
Pittsburgh, delivered	17.63 to 18.13

CHARCOAL

Lake Superior, del. Chi.	27.04

SILVERY

Jackson County, O., fur., in per cents 6—$21; 7—$21.50; 8—$22; 9—$22.50; 10—$23; 11—$24; 12—$25; 13—$27.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents 10—$25; 11—$26; 12—$27; 13—$29; 14—$31; 15—$26; 16—$35.

Coke

Prices Per Net Tons

Beehive Ovens

Connellsville furnace	$2.50
Connellsville foundry	3.25 to 4.85
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	9.00 to 9.40
Chicago ovens	8.00
New England, del.	11.00
St. Louis, del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell., basis	5.50
Portsmouth, O., ovens, Connell., basis	5.50
Buffalo, ovens	8.00 to 8.50
Detroit, ovens	8.50
Philadelphia, del.	9.00

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%, contract	10.00
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% manganese	10.00
North African low phosphorus	9.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish, North African basic, 50 to 60%	9.00
Newfoundland fdy., 55%	9.00
Tungsten, spot and future short ton unit, duty paid	$11.25 to $11.50
Chrome ore, 48% net ton c.i.f.	$21.50 to 22.00

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	26 to 28 cents
South African, 52%	26 to 28 cents
South African, 49-51%	25 to 26 cents
South African, 44-47%	24 cents
Indian, 48-50%	nom.
Brazilian, 46-48% (nom.)	23 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	$40.00
Georgia, Alabama	40.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	35.00
Georgia, Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	40.00
Joliet, Ill., East Chicago, Ind.	49.00
Birmingham, Ala.	50.00 to 51.00

MAGNESITE BRICK

Per Net Ton

9 x 4½ x 2½	$65.00

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	40.00
Domes, Chewelah, Wash., base	22.00

CHROME BRICK

Net ton, Chester, Pa., and Baltimore base, 9 x 4½ x 2½	45.00

Semifinished Steel

PRICES PER GROSS TON

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$30.00
Pittsburgh, bessemer	30.00
Youngstown	30.00
Cleveland	30.00
Philadelphia	35.30 to 36.30
Chicago	31.00
Forging, Chicago	36.00
Forging, Pittsburgh	36.00
Forging, Philadelphia	40.30 to 41.30

SHEET BARS

Pittsburgh	30.00
Youngstown	30.00
Cleveland	30.00
Chicago	31.00

SLABS

Pittsburgh	30.00
Youngstown	30.00
Cleveland	30.00

WIRE RODS

Pittsburgh, Cleveland	37.00
Chicago	38.00

SKELP

All grades, Pittsburgh	1.60c

Ferroalloys

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82%, tidewater, duty paid	$85.00
*Ferromanganese, del. Pittsburgh	89.79
Spiegeleisen, 19-20%, domestic fur. spot†	30.00
Ferrosilicon, 50 per cent, freight all., c. l.	83.50
Do, less carload	88.50
Do, 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., con., del.	11.00
Do, for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.10 to 1.15
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producers' plants, net ton	150.00
Do, one-ton to c. l.	170.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic per ton carload, 23-25% f.o.b. Anniston, Ala., 24%	122.50

†Carloads. Differentials apply to large quantities.

*To users of carloads to 500 tons annually. Differentials apply to users of larger quantities.

Fluorspar

85 and 5 per cent grade

Washed gravel Kentucky and Illinois mines, per net ton	$14.00 to 14.50
Washed gravel, import duty paid east, tide, gross ton	19.00

CARBON
ALLOY
HIGH MAN-GAN-ESE

UNEXCELLED ANNEALING FACILITIES

COLD DRAWN STEELS

WYCKOFF DRAWN STEEL COMPANY

General Offices:
FRICK BLDG., PITTSBURGH, PA.

Mills at:
AMBRIDGE, PA. and CHICAGO

Sales Offices:

BOSTON—627 New C. of C. Bldg.
ST. LOUIS—Planters Bldg.
CLEVELAND—Rockefeller Bldg.
BUFFALO—1312 Liberty Bank Bldg.
DAYTON—1128 The 3rd Nat'l Bldg.
MILWAUKEE—288 E. Water St.
DENVER—1037 U. S. Nat'l Bank Bldg.
MINNEAPOLIS—332 Builders Exchange
PHILADELPHIA—133 So. 36th St.

Chicago Office: 3200 So. Kedzie Ave.

Detroit Office and Warehouse: 6189 Hamilton Ave.

Pacific Coast Representatives: F. H. Currie, 309 Pacific Mutual Bldg., Los Angeles, Cal.

Pig Iron

Purchases Continue on Hand-to-Mouth Basis—Sales Lower Than in February—Prices Steady

PIG IRON PRICES, PAGE 78

Pittsburgh—Demand for pig iron is tending upward, recent business showing a moderate increase over activity early this month, while orders generally are well ahead of the comparable period in February. The character of buying is unchanged, purchases usually being small. Foundry operations remain fairly steady. Prices are more stable with producers quoting $17, valley, for No. 2 foundry, malleable, basic and bessemer, and Pittsburgh furnaces naming prices 50 cents higher. Occasional small sales of southern iron are made in this district below the regular market. The Shenango Furnace Co. blew in one of two Sharpsville, Pa., stacks March 21.

Boston—A Worcester, Mass., consumer purchased 1000 tons of iron from a Buffalo furnace in the past week. Low prices were quoted, upsetting the general level that prevailed for several weeks. Other purchases in this district totaled 2000 tons.

New York—Pig iron buying has picked up slightly, totaling more than 7000 tons in the past week. Further firmness is reflected in prices, with most Buffalo producers quoting $15.50, furnace, minimum, and with Alabama producers generally quoting $11, furnace, or $16.50, delivered New York docks. Southern iron appears to have received a fair test at the new price. The Worthington Pump & Machinery Corp. is inquiring for 1500 tons for its Buffalo plant. The Chapman Valve Mfg. Co., Indian Orchard, Mass., is figuring on 1000 tons of foundry iron.

Buffalo—An inquiry for 1000 tons of foundry iron for a consumer in this district is reported as the major development. While the district price holds firm at $17.50, base, No. 2X iron is being sold for eastern delivery as low as $15.50, Buffalo. New England and southern producers continue to dominate the eastern seaboard on price basis. Shipments are slightly larger than those of February.

Youngstown, O.—If the Shenango Furnace Co. follows its previously announced schedule, its Sharpsville, Pa., No. 3 stack will be producing pig iron by the middle of this week. This will make 12 stacks blowing out of the district's total of 34. Pig iron sales continue small. Bessemer, No. 2 foundry, basic and malleable all hold at $17 valley, while No. 3 and gray forge bring $16.50.

Philadelphia—Reports that an eastern New York furnace sold 40,000 tons of pig iron to a Delaware river pipemaker are discredited here. The market situation generally is unchanged and prices are steady.

Cleveland—March has been a better month than February from the standpoint of shipments but worse than February for sales, on a daily average basis. The improvement in shipments has been confined mainly to the automotive industry. Some consumers still have considerable iron due them on first quarter contracts, and the carryover has held down sales for the second quarter. Current business is restricted to small orders for early delivery, furnace interests with headquarters in Cleveland having booked 13,000 tons in the past week compared with 10,000 tons in the week preceding. Prices are steady at $17, base, furnace, for delivery in Cleveland and $16 for shipment outside. In western and southern Ohio and central and eastern Indiana the market is $16 to $17, base, lake, furnace, and in northern Indiana and southern Michigan, $17 to $17.50, base.

Cincinnati—Increase in the price of southern iron failed to bring any considerable increase in new orders. About 2000 tons of iron was sold in this district, only a small part being southern iron. Inquiries are light.

Chicago—The foundry melt remains spotty but pig iron sales to automotive and specialty melters is gaining. Second quarter inquiry is moderate. Implement foundries still are on light schedules or are down entirely. Occasional resale orders of higher silicon and some off-grade iron are not seriously affecting the base price of $17.50, Chicago furnace. Several orders for southern iron were closed in Michigan, Illinois and some other middle western states ahead of the general advance to $11, base, furnace. Another advance of 50 cents on southern iron is being discussed.

Birmingham, Ala.—Sales continue active but limited to small lots. Books have been opened for second quarter on the present price basis, generally $13, base, for delivery in this district, and $11 for outside.

St. Louis—All southern furnaces now are on an $11, base, furnace, price, equivalent to $15.42, delivered, St. Louis. The northern furnace price remains $17.50. Current sales are small and inquiries for second quarter are lacking.

Toronto, Ont.—Demand for merchant pig iron shows steady gain, but the majority of melters are buying hand-to-mouth. Production is heavier than a month ago.

Ferroalloy Shipments Continue Moderate Gain

Ferroalloy Prices, Page 78

New York—Spiegeleisen sellers report a little improvement, with the bulk of shipments on contracts. Domestic material, 19 to 21 per cent, is unchanged at $30 furnace in carload lots. Ferromanganese also is unchanged at $85, duty paid, in carloads. While the carload price of ferro-carbon-titanium was cut some time ago from $160 to $150 a ton, the price for small lots remains $170.

Pittsburgh—Specifications for ferroalloys continue the gradual improvement that has been in progress since the first of the year. Consumption of ferromanganese and spiegeleisen reflects the moderate increase in steelmaking operations during recent weeks. Prices are unchanged at $89.79, delivered, for ferromanganese and $30 for spiegeleisen with differentials applied on large lots.

Iron Ore Producers Submit Last Year's Prices

Iron Ore Prices, Page 78

Cleveland — Some producers of Lake Superior iron ore are submitting last year's prices on the inquiry from the Ford Motor Co. for approximately 290,000 tons. Others have not quoted. Action is not expected for another week. No change from last year's levels are expected. Large producers say associated iron and steel companies have not indicated their requirements for the year. Stocks are comparatively heavy as indicated by the following report from the Lake Superior Iron Ore association:

	Tons
Ore consumed in January	2,349,522
Ore consumed in February	2,368,243
Increase in February	18,721
Ore consumed in February, 1930	4,062,331
Ore on hand at furnaces March 1, 1931	28,246,513
Ore on Lake Erie Docks March 1, 1931	6,011,374
Total at furnaces and Lake Erie docks March 1, 1931	34,257,887
Total at furnaces and Lake Erie docks March 1, 1930	29,475,298

Scrap

Little Movement in Tonnage or Prices—Melting Steel Shows Most Activity—Delivery Slow

Chicago—Mixed sentiment exists in the steel scrap market, as few dealers are willing to speculate on possible declines, and sentiment wavers on the "long" side. Recent bullishness has moderated, owing to slow reduction of huge reserve piles and uncertainty of continued steelworks operations at existing rates, but prices have not sagged. Several dealer interests have advanced their prices about 25 cents on inquiries against orders. Because of light consumer contracting, this is not reflected in list quotations. Higher prices have been obtained for borings, and sawed and broken rail crops for shipment to outside points. A large foundry interest and a steelworks purchased some borings, the first sold in this district in months.

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated.

HEAVY MELTING STEEL

Birmingham	9.50 to 11.00
Boston, dealers	6.75 to 7.00
Buffalo, No. 1	11.00 to 11.50
Buffalo, No. 2	9.50 to 9.75
Chicago	9.75 to 10.25
Cinci., deal.	9.00 to 9.50
Cleve., No. 1	10.00 to 10.50
Cleve., No. 2	9.75 to 10.00
Det., No. 1 deal.	9.00 to 9.25
Det., No. 2 deal.	7.25 to 7.75
E. Pa. del. mill	10.00 to 11.00
N. Y. del. R. R.	7.00
N. Y. deal. No. 2	5.50
N. Y., deal. yd.	5.00
Pitts., No. 1	12.50 to 13.00
St. L. No. 1 sel	10.00 to 10.50
Federal, Ill.	9.00 to 9.50
Granite City, Ill.	8.25 to 8.75
Valleys, No. 1	12.00 to 12.50

COMPRESSED SHEETS

Buffalo, dealers	9.50 to 9.75
Chicago	8.25 to 8.75
Cleveland	9.00 to 9.25
Detroit, dealers	9.00 to 9.25
E. Pa. new mat.	9.00 to 10.00
Pittsburgh	12.50 to 13.00
Valleys	12.00

BUNDLED SHEETS

Buffalo	7.00 to 7.50
Cinci., deal.	8.50 to 9.00
Cleveland	7.00 to 7.25
Eastern Pa.	9.00
Pittsburgh	11.00 to 11.50
St. Louis	5.50 to 6.00

SHEET CLIPPINGS LOOSE

Chicago	5.00 to 5.50
Cincinnati	5.00 to 5.50
Detroit, dealers	5.50 to 6.00
St. Louis	5.50 to 6.00

STEEL RAILS SHORT

Birmingham	12.00 to 12.50
Boston, dealers	5.50 to 7.00
Buffalo	13.75 to 14.25
Chicago (3 ft.)	11.00 to 11.50
Chicago (2 ft.)	12.00 to 12.50
Cinci., deal.	14.25 to 14.75
Detroit, deal.	12.50 to 13.00
Pitts. (open-hearth, 3 ft. and less)	14.50 to 15.00
St. Louis	13.00 to 13.50

STOVE PLATE

Birmingham	8.00 to 8.50
Boston, con.	8.00 to 8.50
Buffalo	9.50 to 10.00
Chicago, net	7.75 to 8.25
Cinci., deal. net	5.25 to 5.75
Det., net, deal.	6.25 to 6.75
Eastern Pa.	9.00 to 9.50
N. Y., deal. mill	4.75
St. Louis	7.75 to 8.25

COUPLERS, SPRING

Buffalo	13.50 to 14.00
Chicago	12.00 to 12.50
Eastern Pa.	16.50
Pittsburgh	16.00 to 16.50
St. Louis	10.50 to 11.00

ANGLE BARS—STEEL

Chicago	11.00 to 11.50
St. Louis	8.50 to 9.00

LOW PHOSPHORUS

Buff., billets and bloom crops	15.00 to 15.50
Cleveland bil. and bloom crops	16.50 to 17.00
Eastern Pa.	17.00
Pittsburgh billet bloom crops	17.50 to 18.50
Pitts. sheet bar crops	16.50 to 17.00

FROGS, SWITCHES

Chicago	10.50 to 11.00
St. Louis	9.75 to 10.25

SHOVELING STEEL

Chicago	9.75 to 10.25
Cleveland	7.00 to 7.50
St. Louis	8.75 to 9.25

RAILROAD WROUGHT

Birmingham	9.00 to 9.50
Boston, dealers	8.00 to 8.50
Buffalo, No. 1	8.50 to 9.00
Buffalo, No. 2	11.00 to 11.50
Chicago, No. 1	9.00 to 9.50
Chicago, No. 2	9.75 to 10.25
Cinci., No. 2	9.00 to 9.50
Eastern Pa.	11.00
N. Y., No. 1 deal.	10.00 to 10.50
Pitts., No. 2	12.50 to 13.00
St. Louis, No. 1	7.50 to 8.00
St. Louis, No. 2	8.75 to 9.25

SPECIFICATION PIPE

Boston	6.50 to 7.00
Eastern Pa.	11.50 to 12.00
N. Y., deal.	7.25 to 7.50

BUSHELING

Buffalo, No. 1	9.50 to 9.75
Chicago, No. 1	8.25 to 8.75
Cinn., No. 1 dl.	7.50 to 8.00
Cinn., No. 2	4.50 to 5.00
Cleve., No. 2	7.00 to 7.50
Det., No. 1 new deal.	8.00 to 8.50
St. L., No. 1	6.00 to 6.50
Val. new No. 1	11.00 to 11.50

MACHINE TURNINGS

Birmingham	7.00 to 7.50
Boston, dealers	2.00 to 2.50
Buffalo	6.00 to 6.50
Chicago	4.25 to 4.75
Cinn., deal.	4.50 to 5.00
Cleveland	4.50 to 5.00
Detroit	4.00 to 4.50
Eastern Pa.	7.00 to 7.50
N. Y., deal.	3.00
Pittsburgh	8.00 to 8.50
St. Louis	4.00 to 4.50
Valleys	8.50 to 8.75

BORINGS AND TURNINGS For Blast Furnace Use

Boston	2.00 to 2.60
Buffalo	6.75 to 7.25
Cinn., deal.	4.50 to 5.00
Cleveland	7.00 to 7.50
Detroit, deal.	4.75 to 5.25
Eastern Pa.	6.00 to 7.00
N. Y., deal.	3.00
Pittsburgh	8.00 to 8.50

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	7.00 to 7.50
Boston, chem.	9.10 to 9.60
Boston, deal.	2.00 to 2.50
Buffalo	6.75 to 7.25
Chicago	4.75 to 5.25
Cinn., deal	4.50 to 5.00
Cleveland	7.00 to 7.50
Detroit, deal.	4.75 to 5.25
Eastern Pa.	7.00 to 7.50
E. Pa., chem.	13.50 to 14.50
N. Y., deal.	3.50
Pittsburgh	8.00 to 8.50
St. Louis	5.50 to 6.00

PIPE AND FLUES

Cinn., deal.	7.50 to 8.00

RAILROAD GRATE BARS

Buffalo	7.25 to 7.75
Chicago, net	7.00 to 7.50
Cincinnati	7.00 to 7.50
Eastern Pa.	9.00 to 9.50
N. Y., deal.	6.00
St. Louis	7.00 to 7.50

FORGE FLASHINGS

Boston, deal.	5.50 to 6.10
Buffalo	9.00 to 9.50
Cleve. ov. 10 in.	8.00 to 8.50
Detroit	7.75 to 8.25

FORGE SCRAP

Boston, del.	5.10 to 5.60
Chicago	12.50 to 13.00
Eastern Pa.	10.50 to 11.00

ARCH BARS, TRANSOMS

Chicago, net	10.50 to 11.00
St. Louis	11.50 to 12.00

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	9.50 to 10.00
Chi., steelworks	8.00 to 8.50
Cleveland	8.00 to 8.50
Eastern Pa.	11.00
Pittsburgh	11.50 to 12.00
St. Louis	7.00 to 7.50

STEEL CAR AXLES

Birmingham	14.00 to 14.50
Boston, ship. pt.	14.00 to 15.00
Buffalo	15.50 to 16.00
Chicago	14.55 to 15.10
Eastern Pa.	18.50 to 19.50
St. Louis	14.00 to 14.50

SHAFTING

Bos., ship. pt.	13.00 to 13.50
Chicago	12.90 to 13.45
N. Y., deal.	13.00 to 14.00
St. Louis	12.00 to 12.50
E. Penna.	18.00

CAR WHEELS

Birming., iron	10.00 to 10.50
Boston, iron	14.00 to 14.50
Buffalo, iron	12.00 to 12.50
Buffalo, steel	13.50 to 14.00
Chicago, iron	10.50 to 11.00
Chi., roll steel	13.00 to 13.50
Cincinnati, iron	10.50 to 11.00
E. Pa. steel	15.00 to 15.50
E. Pa. iron	13.50 to 14.00
Pitts., iron	13.50 to 14.00
Pitts., steel	16.00 to 16.50
St. Louis, iron	9.00 to 9.50
St. Louis, steel	12.00 to 12.50

NO. 1 CAST SCRAP

Birmingham	10.50 to 11.00
Buffalo (mach.)	11.00 to 11.50
Boston, textile	9.00 to 9.50
Chicago, mach.	10.65 to 11.20
Chi., railroad	10.10 to 10.65
Chicago, agri.	9.50 to 10.10
Cinn., mach. cup., gross	13.00 to 13.50
Cleve. cupola	12.00 to 12.50
Det., net deal.	8.50 to 9.00
E. Pa. cupola	13.00
N. Y. cup. deal.	8.00 to 8.50
N. Y., del. local foundries	12.00
Pitts., cupola	12.50 to 13.00
San Fran., del.	13.50 to 14.00
Seattle	8.50 to 9.00
St. L. No. 1 ma.	9.00 to 9.50
St. L. No. 1	8.50 to 9.00

HEAVY CAST

Boston	10.50 to 11.00
Bos. mach. cast.	11.50 to 12.50
Buffalo, break	8.00 to 8.50
Cleve., break	6.50 to 7.00
Detroit, auto, net deal.	10.50 to 11.00
Det., break., dl.	6.50 to 7.00
Eastern Pa.	11.00
N. Y. No. 1 dl.	8.00 to 8.50
N. Y. break. dl.	7.00 to 7.50
Pittsburgh	9.50 to 10.00

MALLEABLE

Boston R. R.	13.00 to 13.50
Buffalo	12.00 to 12.50
Chicago, agri.	10.50 to 11.00
Chicago, R. R.	12.25 to 12.75
Cinn., R. R. dl.	11.50 to 12.00
Cinn., agri., dl.	12.00 to 12.50
Cleve., rail	12.00 to 12.50
Det. auto deal.	11.00 to 11.50
St. Louis, rail	9.50 to 10.00

RAILS FOR ROLLING 5 feet and over

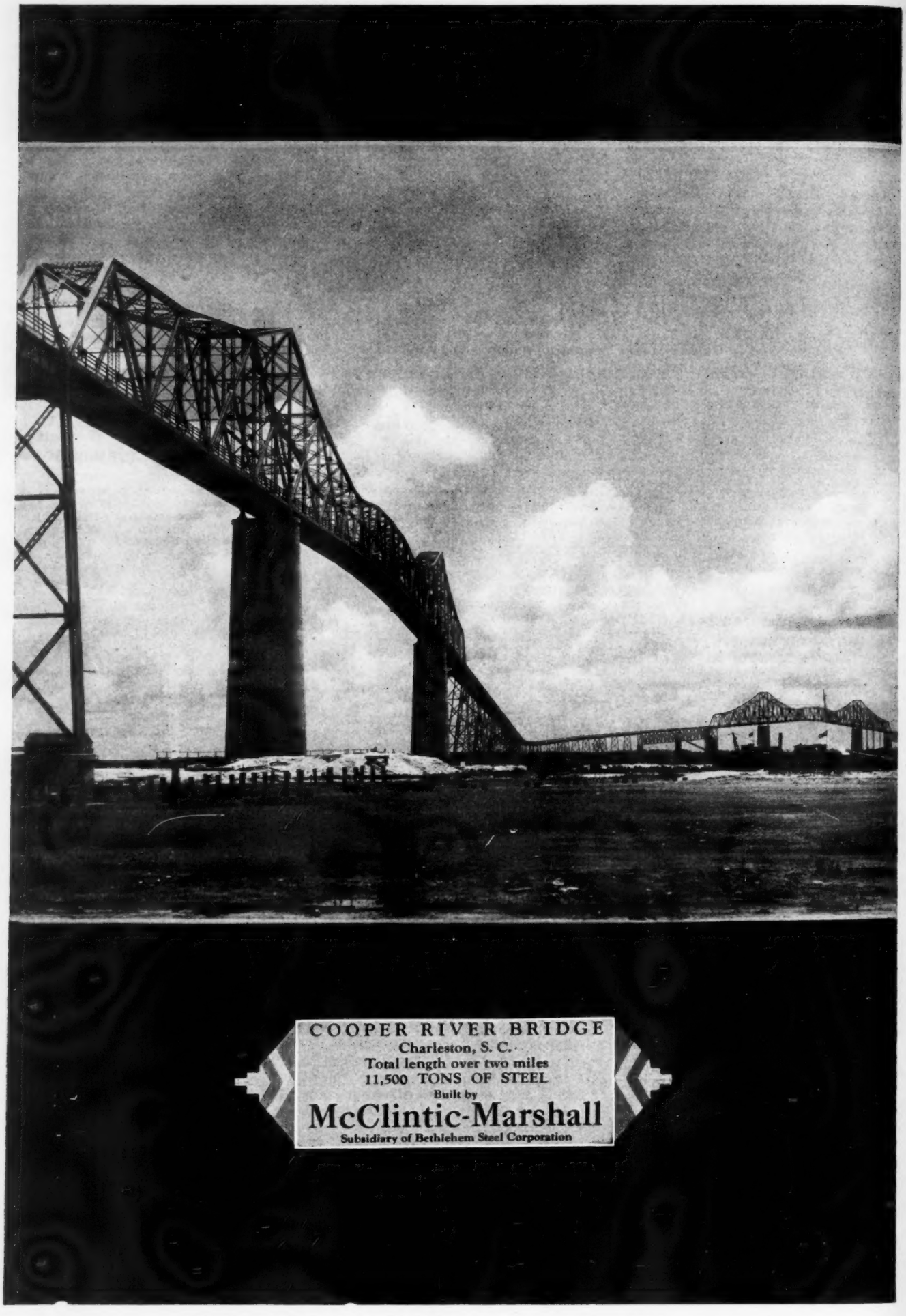
Birmingham	10.75 to 11.25
Boston	8.50 to 9.00
Buffalo	11.00 to 11.50
Chicago	12.00 to 12.50
Eastern Pa.	13.00 to 13.50
New York	9.00 to 9.50
St. Louis	10.25 to 10.75

LOCOMOTIVE TIRES

Chicago, cut	13.00 to 13.50
St. L. No. 1	11.00 to 11.50

LOW PHOS. PUNCHINGS

Chicago	11.50 to 12.00
Buffalo	14.00 to 14.50
Eastern Pa.	15.50 to 16.50
Pittsburgh	15.50 to 16.00



DESIGN BY WADDELL AND HARDESTY, CONSULTING ENGINEERS

The leading steelworks melter also bought about 3000 tons of heavy melting steel at $10.25, the top of the range that has been quoted for 30 days. Some dealers foresee a shortage in open-hearth grades in the event business appreciably improves during second quarter.

Boston—Conditions in steel and iron scrap are looking up in a moderate way. Some heavy melting steel was shipped to Pennsylvania in the past week, the first in some time, while a Worcester interest continues to take skeleton scrap at $6.10. No. 2 steel was off 25 cents, going at $5.30 to $5.55. Prices generally held firm.

New York—Scrap buying and prices are unchanged. Consumers are taking limited requirements against contracts, but with one or two exceptions have not bought additional scrap. One eastern Pennsylvania mill has purchased a fair tonnage of structural material from a wrecking operation. Dealers' buying prices are unchanged. Heavy melting steel continues nominally $10.50, eastern Pennsylvania.

Philadelphia — Scrap buying is sluggish with at least three leading consumers holding up shipments. Prices are unchanged and untested. In some grades no orders of importance have been reported in several weeks.

Bethlehem Steel Co. has bought 1060 tons of mixed scrap at $7.34 per ton and the Midvale Co. paid $21.17 a ton for 3335 tons of armor plate, both from dismantling of the U. S. S. WYOMING.

Pittsburgh—Steel and iron scrap is quiet but steady and activity in most grades is confined to sales of small lots at unchanged prices. Heavy melting steel and compressed sheets continue at $12.50 to $13. Borings and turnings are up 50 cents on a sale at $8.50. The Pennsylvania railroad is offerings a list totaling 52,000 net tons. Over 20,000 tons of this is heavy melting steel land rails on which bids have been rejected twice.

Buffalo—Tonnage deals are lacking, principally because dealers are disposed to refuse offers below their established price ranges. Interest among dealers centers this week in a report that Bethlehem has bought a considerable tonnage of scrap in and around New York for delivery to its Lackawanna plant by barge canal early in April.

Cleveland—Iron and steel scrap remains quiet. Rumors of sale of No. 1 heavy melting steel at $11 to a leading independent apparently are without foundation. The last sale made to this interest was in January and was at $11. Higher scrap prices are expected at Detroit, due to entrance of a consumer into the market there, and this may prove a bar to movement of scrap by boat to this district this season.

Detroit—Slight reduction in prices of compressed sheets and loose sheet clippings have been made to bring them in line with heavy melting steel. No. 2 heavy melting steel has been advanced 50 cents on increased use by a steel mill which is experimenting with that grade.

St. Louis—Steel and iron scrap has run into a period of extreme dullness and cuts during the past several days have brought prices down to the lowest levels recorded since before the World war. The melt has not decreased, but mills and foundries are awaiting new business before increasing commitments on scrap.

Cincinnati—The scrap market continues dull with shipments on orders limited to a few cars. New business is light. Chief activity is in heavy melting steel, which may be quoted at $9 to $9.50, a decline of 50 cents, which is a reflection of recent dealers' offers. Some other grades are quoted lower as an adjustment.

Birmingham, Ala.—Heavy melting steel is moving more actively than other grades but the market is dull. Prices are practically unchanged though some reductions have been intimated. Steel holds at $11 for best quality.

Toronto, Ont.—While there has been no change in demand for steel scrap dealers report more active demand for iron grades in small tonnages. Supplies of machinery cast are hardly sufficient to take care of demand.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axles	$11.00
Steel axles	10.00
Car wheels	8.00
Stove plate	8.00
Wrought pipe	2.00
Turnings	2.00
Heavy melting steel	6.00

TORONTO

Steel axles	7.00
Iron axles	7.00
Heavy melting steel	7.00
Turnings	2.00
No. 1 mach. cast (net)	9.00
Malleable (net)	7.00

Sweden Conserves Scrap

The Swedish government has decided to prolong the prohibition of the export of scrap iron from Sweden until Aug. 31.

Coke

Demand for Foundry Fuel Is Steady—Furnace and Industrial Grades Quiet—Price Unchanged

COKE PRICES, PAGE 78

Pittsburgh—Beehive coke demand is quiet and unchanged. Occasional gains are noted in requirements of some foundries but the average of operations is fairly steady. Furnace coke is receiving little call from blast furnace interests. The Shenango Furnace Co.'s stack at Sharpsville, Pa., lighted March 21, is using by-product fuel. Sales of industrial heating coke continue moderate and prices unchanged.

Boston—Coke producers expect shipments during April will exceed those of March, which have been unsatisfactory. New business is quiet.

New York—Specifications for metallurgical coke show only slight improvement, with foundry operations in this district averaging about 50 per cent. Beehive furnace coke is $2.50 to $2.65, Connellsville, Pa. Beehive foundry coke is $3.50 to $3.75, Connellsville, for standard grades, and $4.70 to $4.85, Latrobe, Pa., for premium brands. All are subject to occasional concessions. By-product coke is $9 to $9.40, Newark, N. J.; $11, New England; and $9, Philadelphia.

Cincinnati—No change in quotations on by-product foundry coke for the second quarter has been indicated, the price now $9, delivered, Cnicinnati. Domestic grades are moving in smaller volume.

St. Louis—Shipments of metallurgical coke are at a slightly higher rate than in February. The movement to consumers outside this district has picked up considerably since the first of March. New orders are small.

Birmingham, Ala. — By-product coke production is held at 70 per cent and makers say this rate will continue through the summer. Prices are steady.

Pacific Coast

Steel Sales in 1930 Exceed Same Period Last Year—Prices Firmer, with Some Advances—Current Inquiry Is for Small Lots—Pipe Inquiry Continues Fair for Both Steel and Iron

San Francisco—(*By Air Mail*)—Bookings of steel products on the Pacific Coast so far this year are ahead of the totals for the corresponding period in 1930. While few new inquiries of importance came out for figures a number of large lettings were reported. Prices are becoming firmer and advances were put into effect this week on out-of-stock reinforcing steel bars.

Bars, Plates and Shapes

Awards of concrete bars aggregated 1332 tons and brought the total for the year to 12,687 tons, compared with 9856 tons for the corresponding period a year ago. Among the awards were 300 tons for a dormitory in Los Angeles for the University of California, placed with an unnamed interest, 300 tons for a school in Oakland, booked by the Concrete Engineering Co., and 100 tons for a store in Los Angeles, secured by the Soule Steel Co. No new inquiries of importance developed during the week. Jobbers in the San Francisco district have advanced prices on reinforcing bars from 2.40c, base, on carload lots, to 2.60c. Prices on larger tonnages are firm at 2.50c, and on l.c.l. quantities, 2.90c prevails.

Plate bookings were confined to one lot over 100 tons. The Steel Tank & Pipe Co. booked 200 tons for a 20-inch welded steel pipe line for Oakland. An award is expected to be made within a few days on 4500 tons for a 24 to 36-inch welded steel pipe line for Los Angeles. So far this year plate bookings total 56,254 tons, compared with 9919 tons for the same period a year ago. Bids will be opened next week on 800 tons for a 30-inch welded steel pipe line for Oakland. Prices are unchanged and 2.00c to 2.05c, c.i.f., is general.

Structural awards were the largest for any week so far this year and totaled 11,562 tons, bringing the aggregate to date to 30,597 tons, compared with 21,795 tons for the corresponding period in 1930. The Columbia Steel Co. booked 6000 tons for the San Francisco opera house and the war memorial building. McClintic-Marshall Corp. secured 680 tons for a church in San Francisco and 1500 tons for transmission towers for the Southern California Edison Co. This company also placed 1250 tons with the Emsco Derrick & Equipment Co. and 850 tons with the Pacific Coast Steel Corp. Judson-Pacific Co. was awarded 250 tons for the Livestock building in Sacramento. Most new inquiries called for lots of less than 100 tons. No change in prices on plain shapes occurred and 2.05c to 2.15c, c.i.f. is general.

Other Finished Material

Activity in cast iron pipe was confined to small lots. Redwood City, Calif., opened bids on 328 tons and bids will be opened next week on 136 tons for the national guard training camp near San Luis Obispo, Calif. Little of importance has transpired recently in standard steel pipe.

Coast Pig Iron Prices

Utah basic	$22.00 to 24.00
Utah foundry	22.00 to 24.00
*German	24.25
*Indian	22.00 to 24.00

*C.i.f. duty paid.

Northwest Volume Shrinks

Seattle—While steel awards in the Pacific Northwest were below the weekly average this week, some new work has developed and the situation continues to show gradual improvement. Prices are none too firm but there has been no business recently to afford a real test.

Bars, Plates and Shapes

Demand for merchant and concrete bars has not improved. No large tonnages are pending and local mills find less volume in carlot tonnages than heretofore. No important projects have developed. Awards this week included 100 tons for the Bell street viaduct, Seattle, taken by Pacific Coast Steel Corp. The Austin Co., Seattle, has prepared plans for the Teegardin Products Co. plant, Eighth and Spokane streets, Seattle, involving 142 tons of concrete bars. About 150 tons will be required in state highway work in Ferry county, Washington.

About 700 tons of plates are involved in two jobs placed with Portland, Oreg. plants. King Bros. will build 60 steel pontoons for the United States engineers' pipeline dredging fleet in Oregon, calling for 400 tons, while Beall Pipe & Tank Co., Portland, is furnishing 300 tons of corrugated culvert for the Great Northern railroad extension south of Klamath Falls, Oreg. The United States engineer is also calling for bids at Portland for four steel derrick scows, requiring about 400 tons of plates.

Structural awards were confined to one order for 105 tons, for a hangar at Seattle for the Pacific Air Transport, awarded to Isaacson Iron Works, Seattle. The Austin Co. has the general contract. No important tonnages are immediately pending. Lewis county, Wash., will open bids at Centralia for a 90-foot steel span, March 30.

Finished Materials

The wholesale jobbing trade is a trifle more active but buying is confined to small tonnages. Sheets and light plates are slow. No item is in particular demand but indications are for improved turnover soon. Prices are unchanged.

Seattle is calling for bids for furnishing 60 subway transformers of 100 and 150 kilovolt amperes and also 80 units of smaller size. The city has awarded contract for a three months' supply of gray iron castings at 4¼c per pound with allowance of $12.50 per ton for gray iron scrap. The city has purchased a small boiler from the Puget Sound Machinery Depot and 10,000 feet of 1-inch galvanized steel pipe from Pacific Waterworks Supply Co.

Pipe Demand is Moderate

Contract to furnish Bellingham, Wash. with 600 tons of 4 to 24-inch centrifugal cast iron pipe was awarded the United States Pipe & Foundry Co., through H. G. Purcell, Seattle. American Cast Iron Pipe Co., through its Seattle agency, has the contract to furnish 50 tons of 4 and 6-inch Monocast for Fort Lewis, Wash. Vancouver, B. C. has opened bids for 20,000 feet of 12-inch cast iron, alternate steel pipe, totaling 850 tons. Award is pending. About 11½ miles of 1 to 6-inch water pipe are involved in two contracts awarded in water districts suburban to Seattle, the jobs totaling $56,000.

Old Materials

The scrap markets are unchanged. Demand is slow. Foundries are buying little cast iron and local steel mills are receiving ample supplies of good grade scrap on which the going quotation is $8, gross ton, for both steel and cast iron.

Steel, Wrought and Cast Iron Pipe, and Tubing

Welded Iron, Steel Pipe

Base Price $200 Ton

Base Discounts on steel pipe, Pittsburgh and Lorain, O., to jobbers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago del., 2½ points less. Wrought iron pipe, Pittsburgh base.

BUTT WELD

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk	Gal.
½	58	44½	½	23	5
¾	62	50½	¾	28	11
1—3	64	52½	1 and 1¼	31	15
			1½ and 2	35	18

LAP WELD

2	57	45½	2	23	9
2½—6	61	49½	2½—3½	28	13
7—8	58	45½	4—6	30	17
9—10	56	43½	7 and 8	29	16
11—12	55	42½	9—12	26	11

BUTT WELD

Extra strong, plain ends

½	55	44½	¼ & ⅜	+13	+48
¾	60	49½	½	23	7
1—1½	62	51½	¾	28	12
2—3	63	52½	1—2	34	18

LAP WELD

Extra strong, plain ends

2	55	44½	2	29	13
2½—4	59	48½	2½—4	34	20
4½—6	58	47½	4½—6	33	19
7—8	54	41½	7 and 8	31	17
9—10	47	34½	9—12	21	8
11—12	46	33½			

To large jobbers these discounts on steel pipe increased on black by 1 point and two discounts of 5 per cent; on galvanized by 1½ points with two 5 per cents. On iron pipe large jobbers obtain additional discount of 1 point with 5 and 2½ per cent on black and galvanized.

BOILER TUBES

Carload Discounts, Lap Welded Steel		f.o.b. Pittsburgh Charcoal Iron	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¼—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal Iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

COLD DRAWN

1	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½, 5, 6	46

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill

Random lengths over 5 ft. 55%
Selected lengths, 1 to 18 ft. 53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

Six-inch and over, Bir. ....$35.00 to 36.00
Four-inch, Birmingham .... 39.00 to 40.00
Four-inch, Chicago ..... 46.20 to 48.20
Six to 24-inch, Chicago..... 42.20 to 44.20
Six-inch and over, N. Y..... 37.50 to 39.50
Four-inch, New York..... 40.50 to 41.50
Stand. fittings, Bir. base.... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher. Class A pipe $4 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

STEEL BARS

Baltimore	3.00c
Boston	3.265c
Buffalo	3.15c
Chattanooga..	3.10c
Chicago	2.90c
Cincinnati	3.15c
Cleveland	2.85c
Detroit	3.00c
Houston	3.00c
Los Ang.	3.40c
New York‡(d)	3.10c
Philadelphia..	2.60c
Pittsburgh	2.75c
Portland	3.15c
San Frans.....	2.40c
Seattle	3.15c
St. Louis	3.15c
St. Paul	3.00c
Tulsa	3.65c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.15c
Chattanooga..	3.10c
Chicago	3.00c
Cincinnati	3.15c
Detroit	3.00c
New York‡(d)	3.10c
Philadelphia..	2.60c
St. Louis	3.15c
Tulsa	3.65c

REINFORC. BARS

Baltimore....2.50c-3.31c	
Boston	3.265c
Buffalo	2.95c
Chattanooga..	3.10c
Cincinnati	3.15c
Cleveland ..2.25c-2.44c	
Detroit	3.00c
Houston	3.00c
Los Ang. cl....	2.40c
Los Ang. lcl..	2.70c
New York..2.65c-3.10c	
Phila. 2.40c-3.00c	
Pittsburgh	2.75c
San Fran. cl.	2.30c
San Fran. lcl.	2.50c
Seattle	3.15c
St. Louis	3.15c
Tulsa	3.65c
Young. 2.30c-2.60c	

SHAPES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga..	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los Ang.	3.40c
New York(d)	3.10c
Philadelphia..	2.50c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	3.75c

PLATES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga..	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles..	3.40c
New York(d)	3.30c
Philadelphia..	2.50c
Phila. floor....	5.10c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	2.75c

NO. 10 BLUE

Baltimore	3.25c
Boston	3.915c
Buffalo	3.50c
Chattanooga..	3.60c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.10c
Detroit	3.35c
Houston	3.90c
Los Ang.	3.95c
N. Y. (d)....3.00c-3.40c	
Portland	4.00c
Phila.*†	3.05c
Pitts.**	3.10c
San Fran.	3.65c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.40c
Tulsa	3.95c

NO. 24 BLACK

Balt.*†	3.50c
Boston	4.70c
Buffalo	4.20c
Chicago	3.80c
Cincinnati	3.90c
Clev.***	3.75c
Detroit	3.75c
Los Ang.	4.70c
New York..3.50c-3.65c	
Phila.*†	3.60c
Pitts.**	3.40c
Portland	4.50c
San Fran.	4.15c
Seattle	4.50c
St. Louis	4.05c
St. Paul	3.545c
Tulsa	4.10c

NO. 24 GAL. SHEETS

Balt.*†	4.00c
Boston	5.45c
Buffalo 4.40c-4.60c	
Chicago (local del.)	4.35c
Chicago (outside)	4.35c-4.60c
Cincinnati	4.40c
Cleveland	4.00c
Detroit	4.25c
Houston	5.40c
Los Ang.	5.10c
New York....4.00c-4.10c	
Phila.*†	4.15c
Pitts.**	4.00c
Portland	5.00c
San Fran.	4.65c
Seattle	5.00c
St. Louis	4.60c
St. Paul	4.23c
Tulsa 4.60c-4.75c	

BANDS

Baltimore	3.50c
Boston 4.015c-5.00c	
Buffalo	3.50c
Chattanooga..	3.30c
Chicago	3.10c
Cincinnati	3.35c
Cleveland	3.10c
Det. 3/16-in. & lighter....	3.30c
Houston	3.65c
Los Ang.	4.30c
New York(d)	3.40c
Philadelphia..	2.90c
Pittsburgh	3.10c
Portland	3.50c
San Fran.	3.75c
Seattle	4.15c
St. Paul	3.75c
Tulsa	3.85c

HOOPS

Baltimore	3.50c
Boston 5.50c-6.00c	
Buffalo	3.90c
Chicago	3.65c
Cincinnati	3.90c
Cleveland	3.65c
Det. No. 14 & lighter ..	3.80c
New York	3.75c
Philadelphia..	3.15c
Pittsburgh	4.10c
Seattle	5.15c
St. Paul	3.75c

COLD FIN. STEEL

Rounds & Hexagons

Baltimore (c)	3.30c
Boston	3.50c
Buffalo	3.15c
Chattanooga*	3.85c
Chicago	3.35c
Cincinnati	3.80c
Cleveland	3.40c
Detroit	3.65c
Los Ang. (a)	4.50c
New York	3.40c
Philadelphia*	3.40c
Pittsburgh	3.35c
Portland (a)	4.50c
San Fran.(a)	4.25c
Seattle (a)....	4.75c
St. Paul (a)..	3.85c
St. Louis	3.60c
Tulsa	4.75c

Flats and squares 5c extra, except Tulsa, where 5.14c is quoted. (a) Rounds, hex. only.

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.30c
Buffalo	5.65c
Chicago (soft) (b)..	6.15c
Cincinnati	6.10c
Clev. (b)	5.95c
Detroit	5.40c
Phila. (c).....	4.85c
New York	5.05c

(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
‡Domestic bars.
*Plus quantity extras.
**Less than 25 sheets.
*†50 or more bundles.

TRADE
C C C
MARK

Cleveland-Cliffs

Iron Ore
Pig Iron
Coal-Coke

THE CLEVELAND-CLIFFS IRON CO.
Cleveland, Ohio

Mill Products

Base price cents per pound f.o.b. mill, except otherwise specified. Copper and brass product prices based on 10.00c, Conn., for copper

Sheets

Yellow brass (high)	17.25
Copper, hot rolled	19.87½
Lead, full sheets (cut ½c more)	8.50
Zinc sheet (100-lb. base)	9.50

Tubes and Pipes

Seamless yellow brass (high)	22.12½
Seamless copper	22.37½

Rods

Yellow brass (high, full turnings)	15.50
Naval brass	16.50

Anodes

Copper, untrimmed	17.37½

Wire

Yellow brass (high)	17.75

Old Metals

Dealers' buying prices, cents lb.

Heavy Red Brass

New York	6.75 to 7.00
Chicago	6.25 to 6.75
Cleveland	7.50 to 7.75
St. Louis	6.25 to 6.50

Heavy Yellow Brass

New York	4.50 to 4.75

Heavy Copper and Wire

New York	7.75 to 8.00
Boston	7.25 to 7.50
Chicago	7.50 to 8.00
Cleveland	7.50 to 7.75
St. Louis	6.50 to 7.00

Red Brass Borings

New York	6.25 to 6.50

Yellow Brass Tubing

Cleveland	4.50 to 4.75

Light Copper

New York	6.75 to 7.25
Chicago	6.25 to 6.50
Cleveland	6.50 to 6.75
St. Louis	6.50

Light Brass

Boston	3.50 to 3.75
Chicago	3.75 to 4.25
Cleveland	3.25 to 3.50
St. Louis	3.50 to 3.75

Zinc

New York	1.75 to 2.00
Cleveland	1.25 to 1.50
St. Louis	2.00

Aluminum

Clippings, soft, Cleveland	12.00 to 13.00
Clippings, hard, Cleveland	9.00 to 10.00
Borings, Cleveland	5.00 to 5.25
Mixed cast, Cleveland	5.00 to 5.50
Mixed cast, Boston	4.00 to 4.50
Mixed cast, St. Louis	4.50

Secondary Metals

Remelt aluminum No. 12	11.00 to 11.50
Brass ingots, 85-5-5-5	9.75

Metals

Prices Continue Steady but New Business Is Restricted—Copper Export Sales Rise

New York—Despite lightness of new business, prices of nonferrous metals have been practically unchanged during the past week. Uncertainty continues in copper at 10.00c to 10.25c.

Consumption of metals in the building and automobile industries appears to have increased in recent weeks, but there is no reflection of this development in the current market. Brass mill operations have been more active of late, but new orders for products have been light in the past week or so.

Products are quoted on a 10-cent copper basis.

Copper—Sales in the domestic market have been negligible in the past few days, but little business has been sufficient to keep the market from dipping under 10.00c, Connecticut. At one time it appeared as if the price were about to disappear in favor of 10.25c, but light new business made 10-cent metal more plentiful.

Export business picked up on Tuesday after only a few hundred tons had been booked daily earlier in the week.

Zinc — Prime western has remained steady at 4.00c, East St. Louis. Sales have been confined almost entirely to a few carlots. The 4-cent price is available on deliveries through May in some places. The ore market is unchanged at $24 to $26 a ton. High grade metal is 1 cent over prime western.

Tin—The market has been moderately active on occasion, but dull on most days. Artificial support in London is believed to be the reason for recent price stability. Actually, the tin market still is out of balance on the side of supplies though much effort is being made toward curtailment of output.

Lead—Orders have been for scattered carlots on prompt shipment. Prices here have been steady though London has dropped rapidly.

Aluminum—Consumption has improved a little and new metal prices are steady. Remelt aluminum is quoted firmer.

Coke By-Products More Active; Prices Steadier

New York—Demand for coke oven by-products shows a steady improvement, the gain in distillates being pronounced, especially for toluol. March was the best month for toluol in a long period. Activity in the lacquer industry and increase in automobile production are largely responsible. Benzol, xylol and solvent naphtha show gradual gains. Prices are unchanged, but steadier. Output continues curtailed and distributors predict an increase on several items should present gains in buying be maintained. Naphthalene is unchanged with contract shipments showing some decline. Spot business, however, is fairly active. Phenol is unchanged, demand holding to the recent rate. Sulphate of ammonia domestic buying is steady at unchanged prices.

Coke By-Products

	Spot
Per Gallon, Producers' Plants, Tank Lots	
Pure benzol	$0.19 to 0.20
90 per cent benzol	0.19 to 0.20
Toluol	0.27
Solvent naphtha	0.25
Commercial xylol	0.25
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.16 to 0.17
Per Pound at Producers' Plants	
Naphthalene flakes	3.75 to 4.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.85 to $1.90

Quicksilver Shows Firmness

New York—Quicksilver is firmer, about $101 to $103 a flask for small spot lots. This is the first firmness for some time.

Prices of the Week, Cents a Pound

	——Copper——			Straits Tin		Lead	Lead	Zinc	Alum-		
	Electro delivered	Lake delivered	Casting refinery	New York Spot	New York Futures	N. Y.	East St. L.	St. L.	inum 98-99%	Spot Antimony	Ingot Nickel
March 18	10.00	10.37½	9.87½	27.35	27.65	4.50	4.25	4.00	22.90	7.25	35.00
March 19	10.00	10.37½	9.87½	27.45	27.70	4.50	4.25	4.00	22.90	7.25	35.00
March 20	10.00	10.37½	9.87½	27.30	27.65	4.50	4.25	4.00	22.90	7.12½	35.00
March 21	10.00	10.37½	9.87½	27.25	27.50	4.50	4.25	4.00	22.90	7.12½	35.00
March 23	10.00	10.37½	9.87½	27.12½	27.50	4.50	4.25	4.00	22.90	7.12½	35.00
March 24	10.00	10.12½	9.75	26.90	27.20	4.50	4.25	4.00	22.90	7.10	35.00

Europe

Labor Difficulties Menacing Britain—Purchasing of Continental Steel Is Heavier

London—(*By Cable*)—Depression in the British coal industry is threatening to put 500,000 miners on the dole. A general railroad strike is threatened due to wage adjustments. These are the first rumblings of what may lead to serious labor trouble.

The iron and steel market situation here and on the Continent continues dull. Sentiment is better in Belgium as no further price reductions have occurred and China and India have placed some good orders. Berlin reports American steel companies are competing with Germans in the export markets.

Heavier buying of Continental steel is noted in England. Exports of galvanized sheets and shipments of tin plate are down. A Middlesbrough company has obtained a small New Zealand bridge order. One blast furnace in the Middlesbrough district and one in Derbyshire have been blown out. Northeastern hematite stocks are increasing. Italy is buying sparingly.

Some Signs Give Hope To British Steelmakers

Birmingham, Eng.—A more hopeful tone is evident in British markets, based upon some signs of reawakening trade in the spring. There are at present very few instances of increased buying and anxiety for immediate work to keep the mills operating is unrelieved. In Middlesbrough mill activity is limited to about 50 per cent capacity. A few small orders have come in, including one or two contracts for plates for Canada. Shipbuilding continues dull and practically no new contracts are being made for shipbuilding steel. Structural business provides most of the orders now being executed at the large works on the northeast coast.

In the Birmingham district steelworks find it almost impossible to keep up an average of three days a week. Specifications are scarce and though one or two firms believe they have turned the corner there is little confidence in regard to prospects for second quarter. Builders of railroad cars are getting practically no new business and are unable to pass on specifications to finishing mills. A few orders for special steels are being given out by automobile and cycle works but activity in these trades, which are largely centered in the Birmingham district, is not as great as it ought to be for the season of the year.

Birmingham engineers complain that all structural work is being keenly competed for almost to the point of eliminating profit. The number of fabricating concerns has increased greatly and it will be long before there is sufficient tonnage to keep all structural yards active.

A development of importance this week is the decision of the British steelworks association that all heavy British steel will bear a national mark indicating that the product is British and produced and rolled by British labor. Continental manufacturers had for years rolled sections of British standard specifications to compete in markets requiring British standards of quality. These sections or plates have been banded or marked B. S. which purchasers have taken to mean British steel whereas it meant only British standards.

Steel prices are maintained in those branches where control is exercised by the steel association. But in uncontrolled branches prices are weakening under competition. Makers are now prepared to take a little less than £7 15s ($37.66) for small bars, and the general quotation for billets has fallen to £5 7s 6d ($26.11).

Belgian Steel Market Is Below Profit Level

Brussels—Meetings of the iron and steel exchange in Brussels follow each other with remarkable regularity as to prices, which are uniformly weak, and are characterized by continuous scarcity of orders. There is, however, a small current of orders from India and China, but distinctly insufficient to fill the order books of the majority of works, which now are depleted. Each week prices are crumbling further, and producers

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, March 23	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f.o.b. Ship at Port of Dispatch—By Cable								
PIG IRON		£ s d		£ s d		£ s d		£ s d
Foundry No. 3**.....	$14.22	2 18 6*	$11.91	2 9 0	$11.91	2 9 0	$12.15	2 10 0
Basic-bessemer.....	14.58	3 0 0†	11.54	2 7 6	11.54	2 7 6	13.37	2 15 0
Hematite, Phos. .02-.05	16.77	3 9 0	.....	.....	.....	.....	17.01	3 10 0
SEMIFINISHED STEEL								
Billets.....	$26.12	5 7 6	$15.92	3 5 6	$15.92	3 5 6	$16.04	3 6 0
Wire rods.....	41.31	8 10 0	29.16	6 0 0	29.16	6 0 0	29.16	6 0 0
FINISHED STEEL								
Standard rails.....	$40.10	8 5 0	$31.59	6 10 0	$31.59	6 10 0	$31.59	6 10 0
Merchant bars.....	1.68c	7 15 0	.83c	3 15 6	.83c	3 15 6	.84c	3 16 0
Structural shapes.....	1.68c	7 15 0	.75c	3 8 6	.75c	3 8 6	.76c	3 9 0
Plates.....	1.79c	8 5 0	.96c	4 7 6	.96c	4 7 6	.99c	4 10 0
Sheets, black, 24 gage	1.90c	8 15 0	1.80c	8 4 0	1.80c	8 4 0	1.93c	8 15 0
Sheets, gal., 24 ga. corr.	2.71c	12 10 0	2.23c	10 2 6	2.23c	10 2 6	2.31c	10 10 0
Bands and strips.....	2.06c	9 10 0	.96c	4 7 6	.96c	4 7 6	.99c	4 10 0
Plain wire, base.....	2.06c	9 10 0	1.10c	5 0 0	1.10c	5 0 0	1.10c	5 0 0
Galvanized wire, base..	2.39c	11 0 0	1.46c	6 12 6	1.46c	6 12 6	1.38c	6 5 0
Wire nails, base.....	2.39c	11 0 0	1.13c	5 2 6	1.13c	5 2 6	1.10c	5 0 0
Tin plate, box 108 lb...	$ 3.77	0 15 6	.....	.....	.....	.....	$ 8.26	1 14 0

Domestic Prices at Works or Furnace—Last Reported

			French Francs		Belgian Francs		Renten Marks	
Fdy. No. 3 Pig Iron**	$14.22	2 18 6	$10.98	280(2)	$13.11	470	$18.60	78
Basic pig iron.....	14.58	3 0 0	12.74	325(1)	12.28	440	20.38	85.50
Furnace Coke.....	2.92	0 12 0	6.19	158	5.02	180	5.10	21.40
Billets.....	26.73	5 10 0	19.21	490	17.30	620	26.34	110.50
Standard rails.....	1.79c	8 5 0	1.41c	785	1.57c	1,210	1.37c	127
Merchant bars.....	1.68c	7 15 0	.95c	530	.88c	680	1.38c	128
Shapes.....	1.90c	8 15 0	.99c	550	.88c	675	1.35c	125
Plates.....	1.95c	9 0 0‡	1.26c	700	1.13c	870	1.58c	147
Sheets, black, 24 gage	1.90c	8 15 0	2.21c	1,230	2.34c	1,800	1.26c	117
Sheets, gal. 24 ga., corr.	2.39c	11 0 0	2.66c	1,475	2.73c	2,100	3.56c	330
Plain wire.....	2.06c	9 10 0	1.98c	1,100	2.15c	1,650	2.24c	207
Bands and strips.....	2.06c	9 10 0	1.23c	685	1.27c	975	1.60c	148

*Middlesbrough; †Basic; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 12s 0d ($2.92) f. o. b. Ferromanganese £16 9s 0d ($79.95) delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f. o. b.; **Silicon 2.50-3.00. British quotations are for basic openhearth steel. French, Belgian, Luxemburg, and German are for basic-bessemer steel.

CHROMIUM

High-Carbon Ferrochrome
(maximum 6% carbon)
Low-Carbon Ferrochrome
(in grades, maximum 0.06%
to maximum 2.00% carbon)
Chromium Metal
Chromium-Copper
Miscellaneous Chromium Alloys

MANGANESE

Standard Ferromanganese
78 to 82%
Low-Carbon Ferromanganese
Medium-Carbon
Ferromanganese
Manganese Metal
Silico-Manganese
Manganese-Copper
Silico-Spiegel
Miscellaneous Manganese Alloys

SILICON

Ferrosilicon 15%
Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 85%
Ferrosilicon 90 to 95%
Refined Silicon
(minimum 97% Silicon)
Calcium-Silicon
Calcium-Aluminum-Silicon
Calcium-Manganese-Silicon
Silicon-Copper
Silico-Manganese
Miscellaneous Silicon Alloys

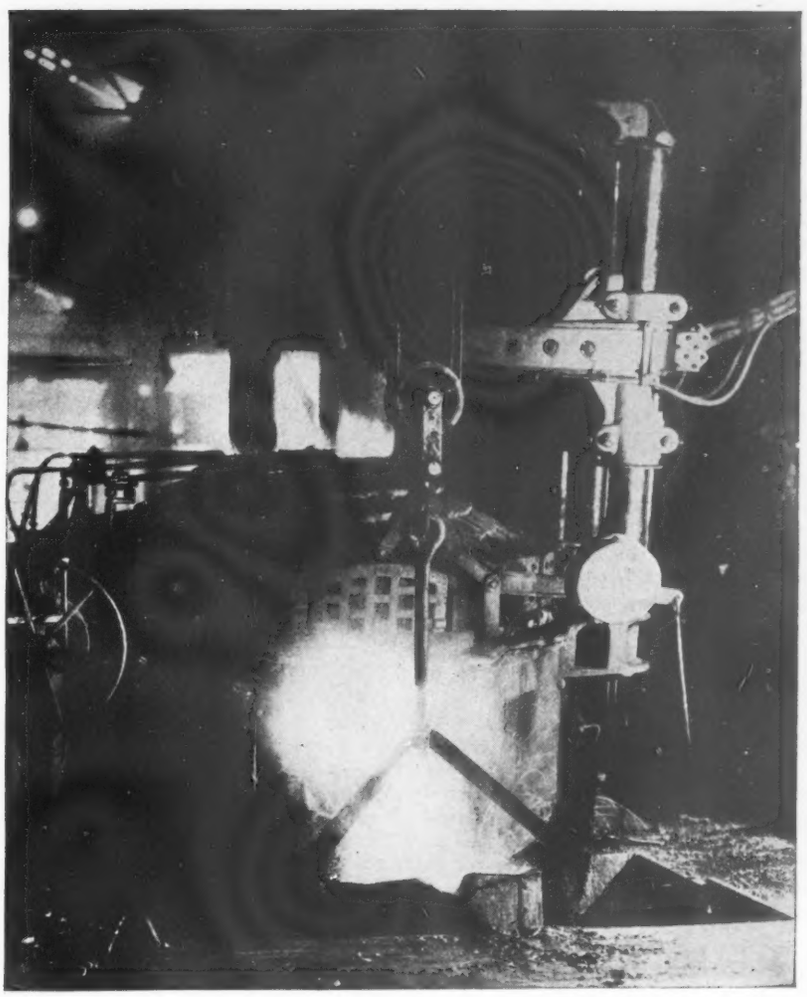
TUNGSTEN

VANADIUM

All Grades

ZIRCONIUM

Aluminum-Zirconium
Ferro-Zirconium
Silicon-Zirconium
Zirconium-Ferrosilicon



Zirconium for Deoxidizing High-Chrome-Nickel Castings

THE value of Zirconium in the deoxidation of high-chrome-nickel acid and heat-resisting castings is rapidly attracting the attention of foundrymen. Zirconium treatment counteracts the effect of sulphur, reduces grain size, eliminates segregation of impurities at grain boundaries, improves density and produces more uniformly satisfactory castings.

It will pay you to investigate fully the advantages to be obtained through the proper use of Electromet Silicon-Zirconium and Zirconium-Ferrosilicon. Write for complete information and arrange for a demonstration in your own plant.

Sole Distributors

ELECTRO METALLURGICAL SALES CORP.

Unit of Union Carbide and Carbon Corporation

Carbide and Carbon Building, 30 East 42nd Street
New York, N. Y.

Electromet
Ferro-Alloys & Metals

have to envisage a reduction of output, and in a few cases the possibility of having to close down. The present position is particularly distressing for producers of pig iron and steel, since it is easier for rerollers to reduce activities, and these transforming works also have the advantage of low prices for their raw material. The burden is mostly on iron and steel producers.

Semifinished steel is suffering from lack of demand, and British firms which usually are good customers can take orders only at low prices. Blooms from 6 to 8 inches are offered at £3 2s ($15), and from 5 to 6 inches at £3 3s ($15.25). Two-inch billets now are quoted at £3 6s ($16), and sheet bars from £3 7s to £3 8s ($16.20 to $16.45). The present level of merchant bars ranges between £3 16s and £3 17s ($18.40 and $18.70), but a few contracts have been taken at lower prices, and La Providence is reported to have sold a tonnage of round bars of various sizes at a basis price of £3 15s ($18.15).

Members of the international wire rod syndicate met at Cologne March 3 and decided to maintain for the second quarter the tonnage quota of 390,00 metric tons, which represents 76 per cent of the output reached in 1926. No changes have been made in prices.

F. o. b. Pittsburgh

(*Concluded from Page* 33)

consolidated report including properties of Spang, Chalfant.

Pipe producers continue optimistic in the belief that considerable line pipe construction is in store for the remainder of the year. Pending work bulks rather large but some hesitation is noted in closing on orders for these projects. Capacity of the Pittsburgh and Youngstown producers has been enlarged considerably since a year ago, but unless awards are forthcoming shortly it is likely that deferred delivery will prevail by midsummer if proposed work materializes in the volume anticipated.

The Youngstown district already is fairly comfortably booked in line pipe for a short time ahead. All producers have experienced poor demand for standard pipe since the first of the year, improvement since January being of less than seasonal proportions.

◆

Featuring proposed construction work of Youngstown companies is the continuous sheet mill projected by the Youngstown Sheet & Tube Co. some time ago but deferred during the litigation over the Bethlehem merger. This matter is expected to develop shortly.

Possibilities of increased towboat construction are seen in reports of an apparent scarcity of motive power for river transportation. A sufficient number of boats of less than 800 horsepower is available for moving small tows, but the increase in traffic in large tows and in barge building has not been accompanied by a similar gain in construction of the larger boats.

Car Business Discouraging

Freight car builders in the Pittsburgh district have shared in the quietness that has prevailed in this industry for a number of months, and although the bulk of the recent order of the Bessemer & Lake Erie railroad for 1050 hopper cars will be filled at local plants of the Greenville Steel Car Co., Pressed Steel Car Co. and Standard Steel Car Co.—three of the four companies which shared in the award—the outlook for future months is not encouraging.

The Pittsburgh district is omitted from the electrification program recently announced by the Pennsylvania railroad, but local industries will benefit as the result of purchases of equipment for eastern installations. Westinghouse Electric & Mfg. Co. is expected to furnish about $15,000,000 worth of locomotives and other electrical equipment for the New York-Washington line. Railway apparatus is manufactured at the East Pittsburgh plant of the Westinghouse company. Considerable steel also will be required for this huge project.

Municipal construction work in the Pittsburgh district of direct interest to steelmakers is headed by several bridges scheduled for building this year. These include the South Tenth Street and Boston bridges over the Monongahela river and a newly-approved high level structure from Pittsburgh to Homestead, the last named to cost about $3,000,000. These three projects may take about 25,000 tons of structural steel. Both the South Tenth Street and Homestead bridges will replace existing structures.

More River Work Ordered

Waterway improvements and dam constructions, amounting to $2,800,000 for rivers leading out of Pittsburgh have been approved by the government. The majority of work in this district will be a continuation of projects already started, excepting a $230,000 fund set aside for first work on a new $4,000,000 fixed dam to be started in the Ohio river near Midland, Pa.

Automobile license plates of the future may don a new dress. Pennsylvania at present is experimenting with the use of 40 or 50 sets of chromium-plated tags that are plainly visible at night when light strikes the numbers. No decision has been reached regarding the plating of 1932 licenses, it is understood.

A recent runup in the price of Superior Steel Corp. stock brought with it rumors to the effect that Bethlehem Steel Corp. was negotiating for its acquisition. Superior officials have denied the report, however. Superior is a producer of hot and cold rolled strip and is selling agent for the Rustless Iron Corp. of America, in addition to being a manufacturer of rustless strip. Operations of strip producers in this district have improved materially since the first of the year, hot mills of some plants being on a 65 per cent basis, compared with 35 per cent in January.

Merger rumors have been rather scarce since the culmination of the Bethlehem-McClintic-Marshall tieup, although Bethlehem's recent activity in this respect has caused it to figure prominently in what groupings have been discussed.

Brick Price Last to Drop

The recent reduction in the price of fire clay and silica brick was the first change in quotations in nearly four years, refractories being among the last of products to follow the general downward trend of commodity prices. Since refractory producers govern their own sources of raw materials, even in some cases to the extent of owning their own coal mines, there has been no reduction in cost of production on this score.

Business recently has been quiet, to date lacking an upturn of the same degree as that experienced by steel companies. Betterment of product and improvements in plant construction and operations over recent years have resulted in longer life of refractories and fewer relinings of open-hearth and blast furnaces than formerly. The poor 1930 steel year has necessitated but little repair and relining work on blast furnaces recently while new construction has been considerably lighter than a year ago.

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By-product coke is playing an increasingly important part in the reduction of Pittsburgh's smoke bill, recently estimated at around $20 per capita annually, and in moderating in fact if not in tradition the city's reputation of being the smoky metropolis. Domestic coke consumption has been rising steadily each year as the result of the preparation of an improved grade of fuel for home use and the education of the public as to its benefits and proper method of consumption.

The Clairton plant of the Carnegie Steel Co., largest in the world, and the Neville Island ovens of the Davison Coke & Iron Co. supply about 90 per cent of the domestic coke consumed in the Pittsburgh district, although the output of these producers would be far from adequate if coke were universally adopted as the domestic fuel.

For Better Crane Service

INTERRUPTIONS in crane service due to frequent wheel changes are eliminated, and cost of upkeep and of operation is materially reduced where cranes are equipped with Carnegie Rim Toughened Crane Wheels.

The process of heat treatment to which these wheels are subjected produces a wheel with an especially tough rim and with high physical properties—a wheel capable of withstanding heavy loads and which is highly resistant to wear.

Specify Carnegie Rim Toughened Crane Wheels on your new equipment. Use them for replacements on your present equipment. While these wheels are generally furnished with tread and flange finished machined and with hub rough bored, they may, if desired, be furnished rough machined and rough bored only. Our wheel engineers are at your service.

CARNEGIE STEEL COMPANY - PITTSBURGH

Subsidiary of United States Steel Corporation

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CARNEGIE CRANE WHEELS

Machinery

MACHINERY market news from eastern centers of production is somewhat more encouraging this week than is that from the Middle West. March continues to be a disappointment to those who looked for decided improvement early in the spring, but on the other hand gains are reported in certain other industries which in due time should influence the machine tool business favorably. Rumors that some of the larger railroads are on the verge of renewed machine tool buying are overshadowed in interest by the fact that automobile production unquestionably is on the upgrade. High hopes are pinned on that fact.

New York—Spotty improvement in buying and inquiry is noted by machine tool dealers and builders and March volume will compare favorably with the previous month in most instances. Inquiry is well spread, covering a wide range, but is generally limited to one or two tools at a time, mostly for replacement. The electric refrigeration industry is operating at an increased rate, but is taking few machines, most plants of this type already being well equipped. This same applies to most of the so-called "new" industries. Railroads are taking little equipment, but some inquiry is pending. Automobile interests and part makers are not active.

Inquiry for grinding machinery is slightly improved. Russia is in the market for a large volume of equipment for an automobile plant. Some ball bearing makers in southern New England now are operating on a 40-hour week basis. Bids are in on a considerable number of tools for governmental departments, and, although new inquiry from this source has declined slightly, there remains a fair volume to be placed. Additional bids will be taken for miscellaneous requirements by the navy department early in April.

Worcester, Mass. — Some inquiry from the Pennsylvania railroad has made its appearance in the market. This initiates what many hope will be extensive schedules from this and other railroads throughout the country. The domestic market continues dull. Simonds Saw & Steel Co., Fitchburg, Mass. has closed on practically all the machines required for its new plant, and otherwise this section apparently holds no immediately active prospects.

There is apprehension in machine tool circles that second quarter quotations may not prove to be as favorable as had been hoped. However, this has yet to be proved the present recession may be only a passing phase. Grinder manufacturers continue to be favored with fair volume of business, most of which is for the foreign market. As yet there has been no appreciable demand through resumption of automobile production.

Pittsburgh — Machine tool men continue to struggle with a dull market. Awards are light and lack improvement over February business, orders generally being confined to small lots usually involving only individual tools. Inquiry has moderated as compared to a month ago and only small lots of miscellaneous tools are called for. Activity in the crane market also continues light.

Cleveland—The week in machine tools has been uneventful, a slight improvement in orders and inquiry from eastern industrial centers serving to balance a falling off in this respect on the part of the middle west in general. Rumors of possible orders from the railroads do not cause any degree of excitement here, improvement in automobile production overshadowing this in importance. No large sales to automobile builders are reported, but scattering sales in that direction give encouragement. Orders released by Russian interests continue to be received.

Employment figures recently released show that conditions have been, and still are, unusually acute in Cleveland. It is gratifying to some of the machine tool builders to discover that the level of employment maintained in their plants over recent months is considerably above the general average. Furthermore, the trend is slightly upward in their plants at the present time.

Chicago — Despite the discouraging machine tool sales in March, a month when ordinarily momentum is gathered which carries business along well through the early summer, dealers have not given up hope of improved activity this spring. So many tentative inquiries are of an indefinite nature that it is difficult to appraise the future. Industrial recovery is indicated however by the more numerous inquiries for repair work, parts and accessories, particularly for presses and other light production equipment.

In the Milwaukee district, several fair-sized inquiries are pending for new tools. Production tools and parts were more active. Chicago, Great Western bought several items against its recent list, and Santa Fe put out inquiry for a 600-ton wheel press, grinder and several other tools. A Texas sheet metal plant purchased shearing equipment. It is understood at least one maker of boring mills has withdrawn old prices in preparation for slight revision upward for about April 1, to bring list prices more in line with costs. Few dealers report March business ahead.

Decline in Crane Business Occured in February

New York—Electric crane shipments, new orders and unfilled orders declined in February, although the value of shipments increased, according to the Electric Overhead Crane institute. Shipments totaled 52 units with a tonnage capacity of 1182, valued at $530,430. This compares with 56 units, tonnage capacity 808, valued at $495,561 in January.

New orders booked in February included 30 units, with a tonnage capacity 679, valued at $267,961. In January new orders totaled 37 units, with a tonnage capacity 991, valued at $422,968. Unfilled orders on March 1 were 102 units, tonnage capacity being 3066½, and value at $1,297,334. On Feb. 1, unfilled orders were 121 units, tonnage capacity of which was 3329½, and value at $1,407,117.

Hoist Association Names Brisbin as Chairman

New York—D. S. Brisbin, general manager of sales, Chisholm-Moore Hoist Corp., Tonawanda, N. Y., was elected chairman of the Electric Hoist Manufacturers' association at the fourteenth annual meeting at the Hotel McAlpin, March 19. William White, Euclid Crane & Hoist Co., Euclid, O., was elected vice chairman. The executive committee will be named at the next meeting to be held here in May.

National Tube Bid Low

Washington — National Tube Co. was low on 67,000 steel boiler tubes for Boston, bids opening March 10, bureau of supplies and accounts, navy department. The low bid was $42,165.

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New England

MIDDLETOWN, CONN.—Wilcox, Crittenden & Co., manufacturers of marine hardware, have approved plans for power plant extensions.

New York

ALBANY—Sweeney Mfg. Co. Inc., whose incorporation recently was noted, will locate in a plant at 412 Clinton avenue, for the manufacture of electric waffle irons, toasters and roasters. Terrance A. Sweeney, Schenectady road, and Andrew Ryan, 414 Clinton avenue, are interested in the company. (Noted March 12.)

BUFFALO—Trico Products Corp., 817 Washington street, is having plans prepared for a 6 to 10-story addition to its automobile accessory plant, work to be started soon. Unit will be 100 x 200 feet. Estimated cost, $300,000 to $500,000.

DUNKIRK—Sanitary Receiver Co. will begin operation about April 1, producing metal containers at the rate of about 1250 per day.

FAIRPORT—Trescott Co., manufacturer of fruit evaporating machinery, has let contract for a 60 x 120-foot plant to C. M. Lombard. Cost is estimated at $40,000.

GARDEN CITY—New power plant, 84 x 103 feet, will be erected by Doubleday, Doran & Co. Inc., at a cost of about $150,000. Work is to be finished by September 1. Contract for design and construction has been awarded to Austin Co., 16112 Euclid avenue, Cleveland.

NEW YORK—General Office Appliances has been incorporated with $100,000 capital by J. A. Mullen, 225 Broadway, to make bookkeeping machines.

NEW YORK—General Road Utility Co. has been incorporated with 2000 no par shares by C. Saleson, 11 Park place, to deal in machinery and tools.

NEW YORK—Winna Mfg. Corp. has been incorporated with $25,000 and 250 common shares by J. Alberti, 1040 East Seventeenth street, Brooklyn, N. Y., to make ventilators.

NEW YORK—Astoria Machine Co. has been incorporated with $5000 capital by J. A. Boccia, 132 Nassau street, to operate as brass and iron founders.

NEW YORK—American Sewing Machine & Motor Co. has been incorporated with $20,000 capital by Panhorst, Janko and Burby, 60 East Forty-second street.

NEW YORK—Joseph Pernick Co. has been incorporated with $25,000 capital by Harry Abramowitz, 110 East Forty-second street, to make textile machinery.

NEW YORK—Bureau of yards and docks, navy department, Washington, advises that the appropriation covering power plant improvements here covers installation of a 1500-kilowatt turbo-generator and auxiliaries. (Noted March 12.)

New Jersey

JERSEY CITY—Montgomery Cylinder & Grinding Co., 678 Montgomery street, will remodel a plant at Tonnelle avenue and Allen street. Cost is estimated at $40,000.

Pennsylvania

PITTSBURGH—F. Tinker & Sons, 5665 Butler street, plan erection of a new plant, to cost approximately $40,000. R. M. Reutti, 5941 Baum boulevard, is architect. Company manufactures knives.

Ohio

BEACHWOOD — Steelflex Corp. of America has been incorporated with 250 no par shares by S. N. Weitz, Leader building, Cleveland.

CLEVELAND — American Multigraph Co., 1814 East Fortieth street, is considering erection of a plant addition. Date of maturity is indefinite. H. C. Osborn is president.

CLEVELAND — Lockport Lead Co. has acquired 10,000 square feet of plant space at 7610 Bessemer avenue, and is moving its smelting and refining plants here from Lockport, N. Y. Operations are to start about April 1. C. A. Johnson is president.

CLEVELAND—Truck division of International Harvester Co. of America, 2905 Chester avenue, will occupy new quarters acquired from the K-W Ignition Corp., 2811 Chester avenue, including a new unit with 35,000 square feet of floor space.

CLEVELAND—Insulated Steel Floor & Wall Co. has been incorporated with 500 no par shares by Holding, Duncan & Leckie, attorneys, Union Trust building. Joseph A. Schlitz, Union Trust building, and J. Harold Traverse, 3085 Arthur street, are interested.

CLEVELAND—K-W Ignition Corp., 2811 Chester avenue, in taking over manufacture of the Swan carburetor from Swan Carburetor Corp., 2031 Euclid avenue, is installing dies, tools, jigs and equipment acquired from the Swan Co., and is adding new equipment. Plant alterations and extensions are being made by the K-W company.

COLUMBUS—Jaeger Machine Co., G. Jaeger president, 520 Dublin avenue, will proceed at once with construction of a plant addition. Bassett & Tresselt, 257 East Broad street, are architects. Contract is held by Theodore J. Schirtzinger, 1353 North High street. Cost is estimated at $30,000. (Noted Oct. 23.)

FREMONT—Fremont Foundry Co., Dickinson street, is building a new core department, 50 x 130 feet. Steinle & Wolfe are contractors.

LIMA—Lima Sheet Metal Products Co. is building an addition to its plant at Charles street and Pennsylvania railroad. New unit will be 60 x 116 feet. Company specializes in steel floor forms for bridges.

MASCOUTAH—Ryan File Works is a new firm here, located at 724 West Main street. A. J. Ryan, formerly associated with Crescent File Works, Evansville, Ind., is manager.

UTICA—Automatic Spring Core Co. has established an office here in the Wilson building, and will make plans later for a plant. Product is used in automobile tire plants. C. E. Lawson is president.

Michigan

DETROIT—Charles A. Gadd, business manager, board of education, advises concerning school unit recently noted that contracts have been awarded. Two shops will be included. (Noted Feb. 12.)

DETROIT—Chevrolet Motor Co., 3044 Grand boulevard, has let contract to J. A. Utley, 729 Penobscot building, for a new plant unit, 80 x 240 feet, to be built at St. Aubin street and Euclid avenue.

DETROIT—Composite Forgings Inc., 275 Campau street, has been incorporated with $20,000 capital by William Cuse, 2237 Lathrop avenue, to carry on the business of founders, blacksmiths and machinists.

DETROIT—International Conveyor & Washer Corp., 1059 Beaufait street, has been incorporated with 1000 no par shares by Erich A. Jastrow, 2937 Pennsylvania avenue, to manufacture and deal in washers and machine products.

FLINT—Acme Pattern Co. has been incorporated with $17,500 capital by Harold E. Dennee and George A. Parker, to design and manufacture wood and metal patterns.

IRONWOOD—Northwestern Motor Bus Co. will build a terminal and shop here at a cost of about $30,000. N. A. Nelson is engineer.

KALAMAZOO—Kalamazoo Foundry & Machine Co., F. J. Buckley president, East Michigan avenue, is building a plant addition, 36 x 144 feet. Principal

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equipment has been secured. Company fabricates structural steel, steel sash and window frames, and will extend its line of structural iron work.

LANSING — Hill-Diesel Engine Co. plans to occupy the former Ryan-Bohn foundry. Plant will be remodeled, and new equipment and machinery will be installed. Floor space available is 100,000 square feet. Harry D. Hill is vice president and general manager of the company.

MUSKEGON — Michigan Welding Supply Co., recently organized, will manufacture automatic arc welding shields under a license from General Motors Corp. Plant space has been leased at the plant of the Clarke Sanding Machine Co. LeRoy A. Prescott is president and Eric Zachau is vice president and general manager.

Illinois

CHICAGO — Chicago Governor & Mfg. Co., 511 South Laflin street, has been incorporated with $40,000 capital by Arthur R. Wolfe, 38 South Dearborn street, to deal in tools.

CHICAGO—Conveyor System Inc., 408 North Lincoln street, has been incorporated with $80,000 capital by Albert N. Charles, 914 Ashland block, to construct and erect elevators.

PEORIA—E. C. Fisher, superintendent of the board of education, proposes construction of a 3-story school, to include four shops, to be built on Warren street. Cost is estimated at $800,000.

ROCKFORD—Bakelite Mfg. Co., 2135 Kishwaukee street, recently organized by William G. Michaelsen and O. F. Foss, has acquired a plant building, 75 x 200 feet. Presses and other equipment will be installed.

ROCK ISLAND—City will develop an airport project, to include construction of hangars. L. Macomber, 664 Michigan avenue, Chicago, is engineer. Total estimated cost is $800,000.

Southern States

BIRMINGHAM, ALA. — Highway Steel Products Co., R. R. Robertson president, Chicago Heights, Ill., is building a branch plant here to manufacture concrete road specialties. Hayes Robertson will be in charge. Initial operations will require about 30 men.

COLUMBIA, KY.—City council has awarded contract for construction of a waterworks, including a pumping station, to the Pittsburgh-Des Moines Steel Co., Neville island, Pittsburgh.

MT. STERLING, KY.—City council is considering erection of a municipal power plant. Burns & McDonnell Engineering Co., Interstate building, Kansas City, Mo., is engineer.

BALTIMORE—Campbell Metal Window Corp., Bush & Hamburg streets, has private plans for a shop extension to cost $10,000.

LILESVILLE, N. C.—B. V. Hedrick Gravel & Sand Co. is inquiring for a 150-foot steel derrick.

LIVINGSTON, TENN.—Municipal council plans to install an engine-generator unit at the municipal power and light plant.

MEMPHIS, TENN.—Memphis airport commission has awarded contract to H. A. McGuire & Co. Inc., 624 Dermon building, for a hangar addition to be erected on Hayford road. Unit will be 20 x 120 feet.

Missouri

SPRINGFIELD—Reynolds Mfg. Co., F. A. Meyer secretary, plans to install equipment for the manufacture of aluminum castings.

ST. LOUIS—Busch Sulzer Bros. Diesel Engine Co., 3300 South Second street, has plans for a machine shop.

Arkansas

CUSHMAN—Edward F. Goltra, LaSalle building, St. Louis, and Wilson Bradley, Deerwood, Minn., are reported to be investigating sites in this vicinity for the erection of a plant for the working of low grade manganese ore by the Bradley process.

Texas

CORPUS CHRISTI — Nueces Iron Works has been incorporated with $10,000 capital by M. L. Yount, to do ornamental iron and machine work.

FT. WORTH—Quisle & Andrews, Iola, Kans., are reported to plan establishment of a branch plant here for the manufacture of oil well machinery.

GALVESTON—City, J. E. Pearce mayor, will take bids soon for a water pump to be installed at Alta Loma pumping station. O. E. Casey is waterworks commissioner.

PORT ARTHUR — Port Arthur Foundry Inc. is completing the first unit of a gray iron foundry, 30 x 50 feet, which includes a 42-inch cupola. An overhead crane will be installed. G. R. Brent is president and general manager.

Wisconsin

HORICON—E. W. Schilling, city clerk, closes bids April 9 for furnishing and installing one 500-gallons per minute centrifugal pump and one 500-gallons per minute horizontal centrifugal pump for the city water plant.

MILWAUKEE—Delta Mfg. Co., manufacturer of metal specialties, will build a 2-story addition, 38 x 82 and 23 x 42 feet, at 3775 North Holton street. F. F. Drolshagen, 647 West Virginia street, is taking bids.

SUPERIOR—Board of education is having plans drawn for a vocational shop building, 100 x 200 feet, to be built as an extension of Central high school building. Work will begin about April 15. Cost is estimated at $60,000.

Kansas

WICHITA—Buckeridge & Ernstmann Machine Co., 232 South Water street, has been incorporated with 200 no par shares by W. F. Buckeridge, to operate a general machine shop.

Colorado

VALMONT—Public Service Co. of Colorado, Denver, will build an addition to its power plant, at a cost of about $1,000,000.

Utah

SALT LAKE CITY—Utah Power & Light Co. is considering erection of a steam operated electric power plant. Cost is estimated at $500,000.

Pacific Coast

ALAMEDA, CALIF.—Sorrenti Aircraft Corp., 1910 Webster street, organized for the design, construction and repair of planes, has secured 10,000 square feet of floor space. S. S. Sorrenti is president and Otto Morgensen is chief engineer.

LONG BEACH, CALIF.—Mexican Central Airways plans to build an aviation terminal here. Cost is estimated at $150,000.

LOS ANGELES — Minneapolis-Moline Power Implement Co., Minneapolis, is building a branch assembly plant and distributing unit, at District boulevard and Everett avenue, at a cost of about $80,000.

LOS ANGELES—Consolidated Steel Corp. Ltd., box 1348, Arcade station, advises through G. J. Carroll, production manager, that welding shop recently noted will be equipped to do welded tank work, welded pipe and welded plate work in general. Unit will be 140 x 750 feet. (Noted March 12.)

OAKLAND, CALIF.—East Bay Pattern Works, recently organized by J. Raymond and J. Gaidos, will manufacture metal patterns and aluminum castings. Company has located at 1044 Fifty-first avenue.

OAKLAND, CALIF.—Herrick Iron Works, S. S. Herrick president, Eighteenth and Campbell streets, is considering erection of an addition to its fabricating shop and other improvements.

OAKLAND, CALIF. — Owens-Illinois Glass Co., W. I. Cole manager, 133 Kearny street, San Francisco, will erect a glass plant here, to include a machine shop. Plans are private. Cost of the entire project is estimated at about $1,000,000.

SAUSALITO, CALIF. — Enterprise Boat Building Co., 1355 Bush street, San Francisco, plans to build a 2-story plant here. Cost is estimated at $40,000.

BELLINGHAM, WASH. — Reid Brothers Co. has organized Bellingham Iron Works to operate the Burpee Iron Works plant, 614 Morris avenue, for the manufacture of canning machinery.

SEATTLE — Rainier Ornamental

Iron Works will begin construction at once on a shop building at 4021 Eighth avenue south. Unit will be 80 x 112 feet.

SEATTLE—Ballard Iron Works Inc., Salmon Bay terminal, whose incorporation recently was noted, advises through E. C. Henning, vice president and manager, that the company is a reorganization of Ballard Iron Works. Plant buildings are leased and equipment has been obtained. Company manufactures marine hardware, logging and railroad track tools and forgings. (Noted March 12.)

SPOKANE, WASH.—All-West Pump Co., 930 North Howard street, whose incorporation recently was noted, advises through P. H. Williams, 35 West Seventh street, president and general manager, that the company will manufacture and market irrigation and domestic water supply pumps, electric and engine-driven. Plant arrangements are completed and all equipment installed for present needs. Company will be in the market for up-to-the-minute pump testing appliances, electrical and hydraulic. (Noted March 5.)

STEVENSON, WASH. — Columbia River Power Co., Seattle, is considering erection of a hydroelectric plant near here, to have 30,000-horsepower capacity. Approximate cost, $2,000,000.

Dominion of Canada

ST. JAMES, MAN.—Western Canada Airways, 914 University Tower, Montreal, Que., advises that hangar units at Stevenson field here, recently noted as damaged by fire, will be rebuilt immediately. Estimates are being prepared. (Noted March 12.)

WINNIPEG, MAN.—Winnipeg Heating Ltd. is reported to plan erection of a plant addition to cost $1,000,000.

BROCKVILLE, ONT. — Eugene F. Phillips Ltd., 5795 De Gaspe street, Montreal, Que., is receiving bids for machinery and equipment for its plant addition here. J. M. Miller, 648 Dorchester street west, Montreal, is architect.

HAMILTON, ONT.—Jenkins-Nicholson Machine & Mfg. Co. Ltd., A. K. M. Jenkins president, is reported to be in the market for machinery and equipment.

KINGSTON, ONT.—Crescent Wire & Iron Works Ltd., Princess and Nelson streets, advises through K. D. Moncrieff, secretary-treasurer, that the company has alternative plans for construction of a new building and has retained Thomas A. Andre, 324 Johnston street, as contractor. If addition is constructed, unit will be 40 x 60 feet. If plant is to be built on a new site, unit will be 50 feet wide, extending 90 feet in one direction and 60 feet in another. Whole matter is still under consideration. Possible equipment additions are a small crane and polishing equipment. (Noted March 12.)

KITCHENER, ONT.—Key Stone Co. Ltd. has been incorporated with $40,000 capital by David G. McIntosh, to manufacture and deal in artificial stone.

LONDON, ONT.—E. V. Buchanan, general manager, public utilities commission, is inquiring for bids on two electric pumps, with daily capacity of 2,000,000 imperial gallons.

LONDON, ONT.—City Gas Co. Ltd., 215 Dundas street, will erect several gas containers. Building program for the year involves expenditure of $1,000,000 for containers, buildings and equipment.

MICHIPICOTEN RIVER, ONT. — Parkhill Gold Mines Ltd., care of Canadian Enterprises Ltd., 1440 St. Catharine street west, Montreal, Que., will erect a mill in this district and purchase equipment to cost $75,000.

ORILLIA, ONT.—Tudhope-Anderson Co., R. W. Phelps manager, will install new machinery. Company manufactures tractor plows and tractors.

OTTAWA, ONT.—F. C. Asquith, acting commissioner of works, will call bids soon for equipment for waterworks and filtration plants, to include three pumping units of 17,000 gallons capacity each, and a 400-horsepower diesel engine. Gore, Nasmith & Storrie, Confederation Life Building, Toronto, Ont., are consulting engineers.

TEMIGAMI, ONT. — White Bear Mines Ltd., 132 St. James street, Montreal, Que., proposes to secure mine equipment to cost about $75,000.

New Trade Publications

FORGING HAMMER—Nazel Engineering & Machine Works, Philadelphia, has issued a folder explaining advantages of its motor-driven, air-actuated forging hammer for economical forging.

CRANE CONTROL — Electric Controller & Mfg. Co., Cleveland, in a current bulletin sets forth claims for its controllers for electric cranes of all makes. Illustrations show various installations.

TOOL STEEL—A booklet on heat treatment of its hammered crucible tool steels has been issued by the McInnes Steel Co., Corry, Pa. A chart shows approximate relations between Brinell, Rockwell and Shore hardness.

METAL CURB—A pamphlet on its metal curb for use in highway construction has been issued by the American Rolling Mill Co., Middletown, O. Application of the curb and tie-rod design is made clear in text and illustrations.

FOLDERS AND BRAKES—Bulletin No. 74 by the Niagara Machine & Tool Works, Buffalo, manufacturer of metalworking tools, covers its line of folders and brakes, for hand and power operation. Illustrations show the line of work possible to be done on these machines.

SMALL GANTRY CRANES — Designed as helpers for larger cranes, a line of small gantry cranes has been perfected by Cleveland Electric Tramrail division of the Cleveland Crane & Engineering Co., Wickliffe, O. These are illustrated in a bulletin just issued, showing applications where their use is economical as an aid to the larger installations.

AIR COMPRESSOR ACCESSORIES —A catalog has been issued by the Westinghouse Air Brake Co., Wilmerding, Pa., covering accessories for use with Westinghouse steam and motor-driven compressors in the industrial field. It is No. T-20-35. Illustrations and test cover each item.

STOKER UNIT—Combustion Engineering Corp., 200 Madison avenue, New York, in a current bulletin describes a new self-contained stoker unit with electric drive and integral fan construction. It presents halftones and an application drawing, table of dimensions and capacities for three sizes and discussion of its features.

REFRIGERATION CODE—American Standards association, New York, has published the American standard safety code for mechanical refrigeration as sponsored by the American Society of Refrigerating Engineers. The pamphlet includes a nomenclature of terms in refrigeration and a safety code to be followed in the installation and care of such equipment.

PYROMETERS—A folder from Illinois Testing Laboratories Inc., 141 West Austin avenue, Chicago, emphasizes the importance of proper temperature in the heat treatment of steels and suggests the use of its indicating pyrometers. Several models are illustrated and described.

CARBON DIOXIDE INDICATOR—A catalog by the Brown Instrument Co., Philadelphia, illustrates and describes indicating and recording instruments for measuring the CO_2 content of flue gases. The importance of the CO_2 content in the flue gases is pointed out as a measure of combustion efficiency. Explanation of the operating principles of the instrument is combined with illustrations of typical uses.

CHARGING CARS — Steel mill and foundry cars designed for charging and carrying ingots, and core oven cars and core racks are described in catalog No. 24 of the International Clay Machinery Co., Dayton, O. The equipment is shown in typical uses and design details are given in drawings. A sand conditioning machine, pug mills, grinding pans, roller bearings, annealing cars and various miscellaneous devices also are illustrated and described.